THE STUDENT WORLD

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Christians in a Technological Era

The theme of this issue of *The Student World* and a substantial part of its content come from a consultation held at the end of April by the WSCF and Pax Romana, the "international Catholic movement for intellectual and cultural affairs". At the end of this meeting the following communiqué was issued :

> Some 40 students and recent graduates from 25 countries and five continents gathered recently in Louvain, Belgium, to examine together the implications of modern scientific achievements for Christian witness. Our discussions centred on the role of scientific research in accomplishing God's plan, and members of both organizations stressed the need for unconditional commitment on the part of Christians in order to bring the light of the gospel into the technological revolution. We agreed also on the necessity of adapting the language and method of presentation of the gospel in terms understandable to modern man. We found once again that our discussions together have given rise to an atmosphere of Christian brotherhood and charity which has always been characteristic of the relations between Pax Romana and the WSCF.

This consultation was not the first such joint meeting. One was held in 1955 at the Ecumenical Institute, Bossey, on the theme, "University, Culture, and Human Community". That

meeting also formed the basis of an issue of *The Student World* [1], whose theme was "Faith, Art, and Culture". The Louvain meeting is thus another example of the increasing efforts in many parts of the world for contact between Roman Catholics and other Christians. These encounters, meetings, and discussions are signs of a new period in the history of Christianity. As a reflection of the Louvain meeting, this issue of *The Student World* is itself another manifestation of the new ecumenism. We are very grateful to our friends of Pax Romana for permitting us to print the addresses given at the consultation.

By common agreement, Pax Romana and the Federation choose for their discussions subjects which arise out of their common concern for the university and the world in general, rather than the traditional issues in dispute between the churches. At Louvain we all agreed that the present trend of science, and the increasing role played by technology, present Christians with a theme which we must now study much more deeply than in the past.

Today science has a new dimension. That is why we have to add to our understanding of "science" an understanding of technology. If we agree with the general definition given by Pastor Morel that science is the accumulation of information, and technology the manipulation of this information [2], then it is not enough for us to accumulate knowledge ; we must know what to do with it. Science is concerned with the question "how" and not with "why" and "what for". Of course, as Christians we are properly concerned with "why" and "what for", because we know that our world comes from God and has its place in his ultimate design. During the last thirty or forty years the theologians have rediscovered for us the eschatological dimension of our faith and life as Christians, but is it not true that this has to some extent made us forget the importance and difficulty of the question "how". This can be seen in many articles dealing with ethical questions which insist that "there are no recipes". Faced with modern science and technology, we should not be afraid to give greater attention to the question

[1] *The Student World*, No. II, 1955.
[2] See p. 35.

"how", but should on the contrary realize that this will help us to be more faithful in our attempts to answer the ultimate, the "what for", questions of Christian life. As Christians we should not be afraid to concentrate our efforts on discovering new ways of concrete obedience in the complex political, social, cultural, and technological situation in which we live. There is an imperative need for our generation to come to terms with technology in Christian thought and life. We hope that the present issue of *The Student World* will contribute to this enterprise.

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I should like to call the attention of our readers to the letter that precedes this editorial. We need as many answers as possible in order that the WSCF Executive Committee may reach the wisest decisions for the future of our publications. But whatever form *The Student World* may take in the coming years, as its new editor I should like to ask our readers for their continued interest, support, and comments, and I thank you in advance for your co-operation.

VALDO GALLAND.

Faith and the Technician Mentality

JEAN LADRIÈRE [1]

I. THE PROGRESSIONIST SPIRIT

The technician mentality and the atheistic spirit

As there are many things to say about the relationship between the life of faith and the technician mentality, I shall have to select, and I propose to speak about what seems to me to be a particularly important aspect of the content of the technician mentality, — and I will explain what I mean by this — "the progressionist spirit". As I understand it, the purpose of this lecture is not so much to talk about what technological life can mean for the believer, the Christian, but rather to analyse the content of the technician mentality so as to state the problem that we must then discuss together, the problem of what technology means for the Christian. Since this is the point which we must reach in the end, I shall begin by stating a fact, which seems to me extremely important, about technology, or rather about the technician mentality, and that is the connection which is becoming evident today between the technician mentality and the atheistic spirit. So, I make it clear from the start what is the most radical and difficult aspect of the problem : I state it in its most extreme form. That seems to me the way to shed light on the matter. There is a connection, then, between the technician mentality and the atheistic spirit, the atheistic mentality, a connection which is sometimes veiled, implicit, and in some cases perfectly explicit, positive, claimed. In the communist world, atheism is certainly related explicitly, and in the most avowed manner, to science and technology ; in any case it is related to the interpretation of science and technology.

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In the earlier Marxism, in what I feel tempted to call paleo-Marxism, there were certain thoughts about atheism, but what to me seems very striking is that the atheism of today has little to do with this paleo-Marxist atheism. The atheism of today seems to represent itself as a scientific position, a sort of victory of the scientific spirit. And atheist propaganda seems to make use — if not exclusively at least by preference — of arguments drawn from science, and from the results of technology and its applications. These arguments, moreover, are extremely simplistic, and they may make you smile, but what is important is the mentality which they reveal. I think at this point, for instance, of an argument used in Soviet literature, which explains that it is quite certain that heaven cannot be inhabited by God, as has always been said, because now we launch sputniks into it, and it is obvious that "heaven" is a space in which man can move ; in fact it is space which belongs to man — and if it belongs to man it does not belong to God ; it is a legend, a mythical picture. Of course, this is a ridiculous argument ! But if it is used, we must suppose that it makes an impression on people who have neither theological nor scientific education, and are perhaps not aware that in the use of the word "heaven" there is a play upon words. However this may be, in spite of its somewhat ridiculous character, this argument, and other similar ones, reveals a state of mind, a mentality in which the atheistic attitude appears to be related to the technician's attitude. The same relation also exists outside the communist world. It is doubtless a relationship which remains in general implicit, which is not the subject of an affirmation, which is not the concern of propaganda, and of which those in whom it is to be found are perhaps not fully conscious ; but it is no less a relation which we can easily observe around us. We all know some research workers for whom the practice of applied science, or of technics simply, seems to be all they need to live for, and which above all quite obscures for them the domain of the religious life. The religious problems of which they are aware because people in their circle discuss them, seem to them devoid of meaning, uninteresting ; and, without being exactly hostile, they are quite indifferent to these questions, just as they are also, it must be said, to philosophical questions. Philosophy

seems to them like empty chatter, and, *a fortiori* if I may say so, theology seems to them to be senseless.

Liberation and the revolutionary spirit

But, if we want to plumb the technician mentality, we must perhaps introduce a third term alongside technology and atheism, and this third term seems rather more related to the movement of modern societies. To describe it I would suggest the word "liberation" or "liberty". Men proclaim, in all parts of the world, that they want to liberate themselves. They want to liberate themselves from exploitation, from external or internal domination ; they want to liberate themselves from poverty, from the weight of their natural necessities. It matters little here the concrete forms this demand takes ; it is enough to recognize that there is certainly everywhere in the world today this demand for liberty. And the very term, the very word "liberty", is almost a magic word which acts powerfully upon hearts and minds. There is perhaps a myth after all, a myth of liberty and liberation ; we cannot go into it now, but I am observing a fact : the power of this word, and perhaps of this myth. Naturally, if we speak of liberty or of liberation, this in itself immediately evokes certain revolutionary movements, and so what we may call the "revolutionary spirit". There is on all sides in the world today a revolutionary spirit, which shows up now here now there, but which is certainly active everywhere. A revolutionary spirit, using the term in its most general sense, is a spirit which aims at rather fundamental changes in society. We see that there is a certain connection — I would not wish to say a complete connection — between these three terms : atheism, revolutionary spirit in the sense which I have explained, and technician mentality. I repeat that this connection is sometimes affirmed quite explicitly — and this is what happens in the case of communism — and sometimes it is just lived more or less silently.

From archaic to industrial societies

If this connection exists, we are perhaps called upon to ask which of these three terms is the most important, which supplies the motive force. Here I have the impression that the

most important is technology, and that the two others are only a sort of mask. Obviously this is a debatable interpretation ; I put it forward simply as a hypothesis. We may indeed ask whether the key to all these contemporary phenomena does not lie, quite simply, in the fact that we are in the presence of a vast transformation of human societies which, as Father Teilhard de Chardin said, must pass out of the neolithic stage (which was typified by the existence of preponderantly agricultural societies) into the industrial stage. What has been happening during the last century and a half is a switch of humanity towards a new type of society based essentially on industry. We could support this thesis by appealing to many facts in contemporary history. I will quote one of these which seems rather impressive to me : Marxism is a revolutionary theory, born in an industrial country, and appearing as an interpretation of the evolution of industrial societies. At the present time, a hundred years after the appearance of the Marxist theory, we observe that no industrial country has become communist, in any case not by its own efforts, but we observe also that the countries which have become communist are those which, at the moment when they did so, were not at all industrialized, or were only beginning to be so. We may therefore ask whether the profound forces, the hidden dynamisms, which used communism as a sort of mythical veneer, had not precisely this significance, that they led to the rise of industrial societies, to the transformation of archaic societies into industrial societies. And now, what we call the problem of the underdeveloped continents seems largely to be the problem of the transformation of backward societies into industrial societies by one means or another. Moreover, one has increasingly the impression that what interests man is the means rather than the doctrines. Communism, which was a sort of philosophical luxury for industrialized countries, a subject for philosophical or moral debate, today stands in these underdeveloped countries for a more or less efficacious technique : it is judged not on its philosophical or moral content, but, it seems to me, on the efficiency which it represents.

So, it seems more and more that the real criterion which men tend to apply is not so much (as it perhaps was during

the last century and still perhaps is in advanced countries) a moral, theoretical, ideological criterion, but a criterion of efficiency. What they want, at all costs, is to catch up with the advanced countries by the most rapid means. Naturally, it is not only for pleasure that they want to catch up, nor simply to imitate the advanced countries, but because there seems to be today in the world a model for social organization which has become imperative, and that is the industrial model. What we call an "advanced society" — the expression itself is revealing — is simply a society which has already gone far along the road of industrialization. There is something curious in the conflicts which rage in the contemporary world : witness the cold war for example. Obviously the cold war has many aspects. There are of course the political and the ideological ones, but there are also the technological aspects. The cold war is in part a war of technicians : who will be the first to find a more powerful bomb, who will be the first to find a more effective rocket which cannot be intercepted, or at any rate intercepted in time ? One has the impression, if one stands back a little from the struggle, that one effect among others of the cold war has been to encourage a considerable development of certain techniques such as atomic and rocket techniques. We may indeed ask whether anyone would have made so great an effort, for example in the rocket field, if there had been no cold war. So one may imagine a sort of evil genius pushing men into certain lines of research. As men's inertia is very great, what I may call "indirect motivations" must be brought into play. An appeal to the direct motivation would consist in saying, "Look how interesting it is to travel in inter-stellar space ; don't you think it would be worth while to work for such a project ?" Well, a speech like that would have had little success ! The answer would have been, "Of course, it would be very interesting." But nothing more would have happened. To produce an effect, appeal had to be made to indirect and powerful motivations, to motivations which stir the emotions. And there is one emotion which is always effective, and that is fear. We see that the result has been excellent : the use of the emotion of fear has led certain societies to agree to considerable sacrifices of money, effort, and man-power to perfect exactly these tech-

niques. Naturally, we do not know all that will come out of it. We all hope that it will be something other than war, something more than military weapons, but we may well ask whether this would have been accessible without the presence of threats and without the military objectives which are, after all, the principal objectives of this research.

I think we could find many examples of this kind. We could find many arguments converging in this direction and showing that the real concern is the transformation of human societies into industrial societies : the industrialization of the world, the constitution of a universal technological society, that is to say, a universal society for the domination of the earth. When I say "universal society", I do not necessarily mean "a society organized on a world basis", something like a world state. I simply mean a society where, in effect, all men, all human groups, are included in the mechanism of industrialization. There is in practice no place today for a group which wishes to stay behind, which would rather hold on to neolithic or archaic forms of existence. There have been, and still are, such groups, but we know that they amount only to a few individuals, and that they are doomed to disappear sooner or later. And this is what suggested to me the idea of an evil genius, who uses human emotions, conflicts, revolutions, ideologies, moral concepts, in order to reach finally an end which we are beginning to descry, and which is exactly this transformation, this sort of global mutation of humanity in its march towards a new kind of society, whose exact nature we do not yet see clearly.

The rational element in "progressivism"

So if we want to sum up all this, if we would try to discover what these three terms have in common — technician mentality, the demand for liberty, and the atheistic spirit — it seems to me that we might suggest the word "progressivism". There is a progressivist mentality in the world of today, and particularly in technology, if it is true that it is technology which in the final analysis constitutes the basic factor. What is this progressivist mentality ? One can easily see what is meant, but it

is not so easy to define. It seems to me that it is necessary to distinguish in it a rational element and an emotional element. There is in progressivism a rational element, and it is simply the setting to work of the possibilities of reason. It is the bias towards approaching every situation in which man finds himself with the instruments of a rational analysis, with the instruments of a reason which feels sufficiently sure of itself to think that it can solve all problems, that there always is a solution to problems ; for which every problem that has a meaning has, because of that very fact, a solution. One will hear talk of this principle : that it is only the problems that can be solved that have any meaning. Behind this mentality, there is, of course, a certain new form of rationalism which is making its appearance : reason now appears to be related to the possibility of solving problems. So, reason is interpreted from the point of view of action and no longer, as in antiquity, from the point of view of *theoria*, a contemplation of the world. It is not so much, or not chiefly, a question of pulling out the intelligible tissue of the world, of describing the intelligibility of the world, but of actually *making* the intelligibility of the world, that is, of making apparent in an effective way this rational and intelligible fibre that is in things. Now, this mentality today is no longer the affair of a few specialists, but one could almost say that it is the mentality of the man in the street. I am always rather astonished to hear people who know nothing about science say, when one speaks to them about difficult questions which preoccupy us, "Oh, we shall find some way." They are sure that we shall find some answer, no matter what. We can speak to them about the most difficult problems, and they are still sure that we shall find some way out. Thus an extraordinary sense of security has taken possession of the modern man, because he is convinced that we shall always find a way, that there is no limit to the possibilities of finding solutions.

The emotional element in "progressivism"

But naturally, in this progressivist spirit, there is also an emotional element ; this is a sort of impatience, almost, I would say, an instability of the mind, the feeling that one must not

become attached to an acquisition, that one cannot stand still, that it is almost an evil, a moral failing, to stand still, that there is an obligation to try something new, to plunge into new formulas, to change. The idea, for example, that there could be oilfields unexploited somewhere seems criminal, absurd, abominable. All available energy should be exploited ; it is a sort of collective duty. The idea that there are human groups who would wish to oppose this also appears abominable ; these groups should be converted or even eliminated ; it is intolerable that there should be unexploited wealth anywhere in the world, or energies not yet harnessed. And here I think of a very fine comparison by Heidegger in a work on technology. He says, "For the poet Hoelderlin, the Rhine was not a river, but in a certain sense a god." This thought indeed is expressed in Hoelderlin's famous poem on Father Rhine. He saw it still from the point of view of a poetic cosmology, or shall we say a cosmic pantheism. For contemporary man, and for the engineer who is the paradigm of contemporary man, the Rhine is an object in which we can usefully sink turbines to provide electric current. And so on. The Rhine was a good example to characterize the mentality of modern man who is impatient to reduce everything to the state of a useful object. That is what I would call the emotional element in progressivism.

II. THE TECHNICIAN MENTALITY

Up until now, I have tried to paint a great backcloth, to attach the technician mentality to a sort of fundamental spirit which inhabits the world of today. Now I would like to consider more specially technology, the mentality of the technician, leaving aside for the time being the other factors of which I have spoken. I shall do it in three parts. I shall speak first of the nature of the technical project ; then of the dangers inherent in it ; finally of the values which it contains ; and that will enable me in conclusion to link up again with our preoccupation, which is the significance of technology for the Christian.

A. The Nature of the Technical Project

An enterprise on the march

Let us ask ourselves first, what is the nature of the technical project ? Let us say, to begin with, that it is a project in the proper sense of the word, that is, an enterprise on the march, an enterprise which is going somewhere, which is orientated in a certain direction. In other terms, technology is not only a series of operations, or a complex of inventions, or a set of partial methods, but it is really a total collective enterprise, a system in movement, which has a meaning and consequently a unity. There is an immanent meaning which makes its unity. Only this project is a project which remains implicit ; I mean that nobody would be capable now of saying exactly what he wants. And of course *a fortiori,* in the past, nobody would have been capable of saying exactly what he wanted. Doubtless they wanted certain things ; in other terms, they had objectives, but these objectives were — and remain — always relatively limited. We have also a presentiment that behind these objectives we will find other objectives, but I do not think we can say that we have a view of the whole, nor that we have a clear view of the finality towards which we are moving. We are therefore somewhat in the position of a swimmer who has dived into a current : he knows very well that there is a current, he knows how he ought to swim in this current, but he does not know whether he will finally arrive at a waterfall where he will be broken to pieces, or whether he will come to a big lake where he will find a marvellous view. We do not know very well what awaits us. Yet we can nevertheless discern certain elements ; we can see upon what this enterprise is based, and we can after all say something about the direction in which we are going, in so far as we discover it indicated in the movement itself.

The basis of the enterprise

And now, what is the basis of our enterprise ? It is based on the discovery of the potential character of the world which is offered us. We have progressively discovered that the world

which is given us, that is, nature, is not a pure datum, but is, in a sense, incomplete ; that there are certain incoherent elements in it which are possibilities, potentialities, and open potentialities, and that our effort may take its bearings on these potentialities, and may actualize them. In other terms, we have discovered the possibility of an actualization of the potentialities of nature, and this discovery soon created the feeling of a duty : we end by having the feeling that, if this possibility exists, it is our duty to complete, so to speak, the movement of nature by directing our effort upon the natural potentialities, so as to draw out of them what of herself and left to her own resources, nature could not have given. A very good image of this is electricity. An electric current does not exist as such in nature ; but, on the other hand, nature has the where-withal for making electric current. Only for this purpose a certain mediation is required ; certain conceptual and material apparatus must be constructed.

The direction of the enterprise

Now, if such is the basis of the enterprise, whither is it going, what is its direction ? There is a very limited objective which is normally suggested — utility. Everyone says : all these inventions, all these new resources, are very useful to man because they improve his living conditions. For example, the internal combustion engine enables men to travel faster, further, in larger numbers, and of course that may be considered to be useful up to a certain point. Here, one may say that progress, or the progressivist demon of whom I spoke a little while ago, again makes use of an emotive element — laziness. If there are automobiles, one need not walk any more, so it is less tiring. But perhaps this is only an illusion. The sociologists say that we work today harder than ever, that in earlier times there was chronic under-employment, just because of a lack of resources, whereas now that there are resources, there is rather a tendency to over-work. So this element of laziness is very relative. Let us say that it only provides a sort of bait : the progressivist demon doubtless uses this utilitarian bait to send us further. In other terms, the satisfaction of certain needs does no more than create other needs, so that we are started on an endless

spiral, and when we think we may be able to work less, in fact we shall perhaps work still harder. Besides, this idea of utility does not get us very far, and we begin to see this very well today, since contemporary technology is becoming less and less utilitarian. I would say that technology is becoming a speculative technology. In fact, it seems to me that in the most spectacular contemporary achievements the utilitarian aspect is after all rather negligible. People who insist on utility say, "Certainly, but it could all have a military use." But can we call this utility ? It would be better to talk of experiment — of a rather monstrous experiment too, an experiment whose real nature we do not even know very accurately. In any case, it seems to me that we could more accurately speak of a speculative technology, of a technology which, in the sphere of action is becoming what science appeared to be yesterday in the sphere of pure thought. And this is perhaps most visible in the most developed of the sciences. Physics, for example, can no longer do without extremely powerful instruments, which, moreover, count among the finest contemporary technical achievements. Scientific research and technical research started off in harness together and have become inseparable, and what once appeared to be a utility has become in some sense a by-product, a side-effect. The important thing, the thing which in any case mobilizes the minds of the most alert technicians, the finest examples of the technician mentality, is precisely the speculative character of the enterprise.

In reality, we do not know very clearly where we are going, what all this is going to reveal in the end, what it will all finally make possible. Those who want to predict begin to talk about a civilization of leisure, and one has the impression that in so doing they are trying to find a justification. As in the past humanism and culture were highly esteemed — and by culture one meant *Belles-Lettres* — and as on the other hand technology has become essential, one tries to find a justification, saying, "Of course, we must now for the time being immerse ourselves in technology ; we shall have no time for literature ; but we shall come back to it with all the more enthusiasm later because we shall have more time, and then everybody will be able to read the classics !" But this seems to me a retrospective way

of looking at the future ; it is looking at the future with the eyes of the past, and it is also perhaps a way of giving oneself a sense of security, because obviously an indescribable future can only create a feeling of insecurity. So, one seeks to find calm by trying to picture the future, and of course one can only picture it to oneself with images of the past. In a sense, one imagines the future as a sort of generalization of what existed formerly in certain aristocratic groups. One imagines the future as being the democratization of Athenian thought !

But there are already very profound modifications which have affected human existence, and these are, in one sense, irreversible ; in particular, technical developments have permitted an increase in the population, have permitted much denser concentrations of people to live in certain areas, and here is obviously an irreversible phenomenon. There is no question, for instance, of an industrial country returning to the neolithic stage. We can see, for instance, how senseless were certain American plans for turning the German people back into a pastoral community after the 1940-45 war. It is impossible to make an industrial people live as they did 500 years ago ; that is quite clear.

The techniques of human relations

In any case, what has happened, and continues to happen, is a definitive break with nature. More and more, human effort is directed to man himself, or, more accurately, to society itself, and no longer to nature. At the beginning, naturally, it is essentially upon nature that human effort is concentrated, because man is still quite unequipped. But as soon as he has made himself an instrument, he applies his energies more and more to society itself, that is, to the organization of human relations, to the way men represent to themselves their life, their future, and the use they make of the objects which are at their disposal. This seems to be very clear in certain techniques of manipulation, for example, the techniques of propaganda, of publicity, of what we call "human relations". Increasingly we see that this is what is important. American sociologists insist upon this fact ; they say that what characterizes contemporary American man is precisely that he is socialized man, and that the new

techniques are applied much more to the manipulation of human relations than to nature. One could say that the problem of the domination of nature has already been resolved ; now a new phase is appearing, the phase of the conditioning of social groups, the adjustment of groups to each other and of individuals to groups. This adjustment is no longer left to chance ; we no longer leave it to automatic mechanisms, but resort to carefully thought out manipulation. Human relations are thus made the object of a technique in the proper sense of the word, and a technique based on a science. We must survey here the whole field of what we could call the human techniques — the psychological techniques, on the one hand, and the social techniques, on the other. It is certain that we are looking for procedures for the adjustment of individuals to groups, and of groups to each other. I think, for instance, of depth psychology. There is still, of course, a good deal of discussion about depth psychology, but there is certainly one interpretation of it which sees it as a means of adjusting the individual to the group. The individual who presents neurotic symptoms, who is no longer completely in control of his behaviour, is interpreted as an individual who is not adjusted to the group. We do not say that he is not adjusted to nature, but that he is no longer adjusted to the group, to the culture, in which he lives. To cure him, we have recourse to a certain technique of human relations — a technique which is itself a human relation. No instruments are employed ; it is a technique using speech only, one which brings a human relation to bear on the subject. It is thought that by such a technique it is possible to rediscover for a neurotic individual a suitable, balanced insertion in the group to which he belongs. Similarly, what we call the techniques of human relations are techniques which make it possible, or will make it possible, to regulate relations between groups.

B. The Dangers of the Technician Mentality

The concentration of power and human decision

All this development contains a certain measure of danger. In the first place, the increase of the instruments of power in our hands to deal with external nature and social nature,

evidently creates an increased responsibility. When we have no instruments, we are largely at the mercy of what we call fate — fatality — the play of laws which control the natural processes ; for example, we are at the mercy of drought and famine. As soon as we have instruments at our disposal, human decisions must intervene. And the more powerful the instruments the more important the decisions are, because indetermination increases ; it increases because the resources are numerous and some are not innocent. We must establish a balance-sheet of possible gain and possible loss, calculating that if we adopt such and such a measure there will be such and such a result, but that at the same time it will destroy a certain equilibrium, and so on. We know what unconsidered application of certain methods of agriculture has cost : for example, a bad use of modern agricultural methods has caused soil erosion. Or again, the use of DDT has banished the insects which fertilize certain flowers, and thus caused the disappearance of certain plants. What is true for nature is also true for man. We do not exactly know what is the internal effect upon individuals of certain methods which we use. I shall cite here only one very massive illustration — the atom bomb. There was a day when men had to take a decision on this subject. It was known that the use of an atom bomb was possible. Were they going to use it ? That depended entirely on a human decision. There was no natural law here ; they did not have to abandon themselves to fate ; they could say "yes", or they could say "no". There were moreover conflicting opinions ; there was a discussion, and finally there was a decision. From that moment an important step was taken : we entered the atomic era. What must be noted is that this decision is at once collective and individual. It is collective because it clearly interests the whole world ; it is individual in the sense that it rests usually on the shoulders of a few. In the case of the atom bomb, it was in the last resort one man, the President of the United States at that time, who had to take the ultimate decision. What is very striking in contemporary society is the extreme concentration of power in the hands of a very small number of men, and the considerable burden of responsibility which is attached to certain functions. Here lies the sociological aspect. But there

is also the moral aspect : we may ask ourselves if men are effectively prepared to face increased responsibilities for themselves and their descendants (for very often these responsibilities concern men of the future as well as those now living). For we continually face problems of this kind. Here is another example : you all remember the controversy in Italy a few months ago because some research worker had tried to develop artificially a human embryo. Was this permissible ? Clearly there is an ethical problem here. But obviously also the progressivist spirit to which I have referred before would come out unconditionally in favour of the experiment : not only could one make it, but one must.

The reduction of man to the status of object

The second danger is the tendency to reduce man to the status of object. Since techniques are not only instruments for the domination of nature, but also instruments for conditioning and manipulating man and human groups, one naturally comes to consider man as a fragment of nature, as an object. The experiment of which I just spoke is an illustration of this mentality, of this attitude. Man reduces himself to the status of subject of an experiment. He tends to empty out the spiritual and ethical content of the human being and to see in himself nothing more than an object for study. Of course, we justify it by saying that it is for his greater good, and for the greater good of future generations, as though the greater good of future generations should follow as a matter of course from an unconditioned development of technology.

The nihilism of the technician

A third danger seems to me deeper and more serious. The development of the technician mentality is related to the power mentality — to seek to control as completely as possible nature in and outside ourselves is obviously to seek an increase of power. But this power-centred mentality, this quest for power, depending on the resources of rational analysis, with all the patience and humility that it presupposes at the same time,

leads pretty often to an obscuring of the question of significance. Norbert Wiener, the founder of cybernetics, has expressed this admirably in a work called *The Human Use of Human Beings :* "We have learned to answer the question *how*, but we are no longer capable of answering the question *why*." We have accumulated a vast store of know-how, but we cannot even tell ourselves for what object we shall use it. It is an admirable way of saying that we are no longer capable of answering the question of meaning. But we have to go further : it must be said that we are no longer capable of seeing that there is a question of meaning. It must be said that we are tempted to consider that finalities can in a sense look after themselves ; that finalities are taken for granted ; that they are inherent in the very effort which we exhibit, in the enterprise itself in which we are engaged. And I think that this attitude finally leads to what we could call the nihilism of the technician, because there is such a nihilism. I would say that there is nihilism as soon as the finalities are slurred over, as soon as there are no longer any effective finalities. Obviously, human action necessarily entails finalities. If anyone makes an experiment, he is looking for something — therefore there is finality. If someone constructs a piece of apparatus, it is because he wants a result, to know whether his apparatus works. There is always finality in the action in the sense that the action has objectives. Only the objectives of technical action are objectives which must remain very limited, short-term objectives, giving the impression of "pseudo-finalities". In other terms, the effort of the technician becomes its own justification, its own finality. There is no occasion to ask why or wherefore ; it is evident that one must do what existing techniques make possible. But it is in doing this that he finds his justification, that he justifies and authenticates himself. Naturally this nihilistic situation is generally masked. What characterizes this forgetfulness of meaning is that the forgetfulness is not conscious as such. As Heidegger said, in his study of the essence of technology, man has not only lost sight of the question of meaning, but he no longer knows even that he has lost it. Heidegger develops this idea in his commentary on a poem of Hoelderlin in which occurs this sentence : *Les dieux se sont enfuis.* Not only have they

fled, says Heidegger, but we have lost all trace of them, we do not know whither they have fled. We do not even know that there have been gods. The world is totally desacralized, but it no longer knows that it is. Man is in distress — for at bottom nihilism is distress — but he no longer knows that he is ; he is no longer capable of knowing. But there are after all some pointers, some symptoms, we might say, which are beginning to make their appearance in the world of today, and which seem indirectly to show just this situation of distress. For example, one such symptom is the apparently aberrant behaviour seen especially among groups of young people in highly industrialized countries. We enquire into this, we talk about the *nouvelle vague*, the *blousons noirs*, the beatniks. Every country has its own expression for this phenomenon : in Poland and Russia they talk of "hooligans", in England of "teddy boys". But I wonder if we should not see in all these phenomena some symptoms (among others, because there are others, but these are particularly obvious ones) of an inner emptiness, which is precisely nihilism, the collapse of meaning. There are also other symptoms, which are perhaps less apparent, or less obviously pathological in character, but which are no less symptoms of a pathological existential situation. Much of the behaviour of contemporary man is insensate behaviour, which manifests the absence of meaning. And moreover much of this behaviour involves the insensate use of technical instruments, for example, the radio, television, means of transport. It seems to me that certain ways of using these instruments manifest the character *in-sensé* of contemporary existence.

The disappearance of the sacred and the devaluation of the symbol

Now, another phenomenon related to all this is the disappearance of the "sacred". If we can solve all these problems, if it is only the problems which can be solved that have meaning, that means in the last resort that what remains of meaning is the same as a realizable operation, an operation, therefore, of a technical nature. It is the new interpretation of reason to which I have already alluded. That necessarily brings with it a desacralization of the world ; there is no longer any mystery ;

there is no longer any reference to any transcendence whatever ; the world is spread out before us like some kind of transparent material, and if it is not quite transparent yet, then it certainly will soon be so. In principle, everything is already transparent : there is nothing that we cannot do or that is not offered to our consciousness. At the same time as this disappearance of the sacred, there is also a sort of devaluation of certain types of language, which are not those of technology : symbolic language for example. The devaluation of the symbol, of the sign : the sign is a tangible reality, but the meaning refers to something else, the non-visible which is not, however, the unsayable. Now the technological mentality does not use the symbol, or if it speaks of a symbol it is in quite a different sense, in the mathematical sense, which is then quite another thing. But the comprehension of a sign as a sign thus becomes difficult, if not impossible, for one who is used to deciphering nature directly, according to a method which gives a certain answer after a certain number of manipulations. But then this has extremely serious consequences from the point of view of the religious mentality, precisely because religious realities are only accessible through a language which uses signs and symbols. There is no way of transmitting religious reality through the language of technology. In proportion as we make ourselves impermeable to religious language, we naturally make ourselves impermeable to the realities which it seeks to reveal through this language.

C. The Values of the Technician Mentality

The greater possibility of justice

However, if technology involves these dangers, it also conceals certain values. It carries with it a value, first of all, from the point of view of the evolution of society, for after all it is very possible that technology will help us to solve what we may call the "social problem" and the problem of justice — will help us to give everybody an equal measure of these resources, whether in relation to the domination of nature and the satisfaction of their primary needs or to the possibilities

of culture. In a situation of scarcity, there is every chance of inequality, but in a situation of plenty, there is more chance of true equality. I say "there is more chance" because after all it is not absolutely inevitable ; in other words, there are moral conditions which remain indispensable. But the resources now exist to give to all equivalent possibilities. And for this very reason, the utilization of technology on the plane of social organization certainly carries with it a great ethical potential.

The development of personality

Technology has also a value on the level of the development of the personality, for if it is true that the development of our power over the external world may lead to the abolition of the question of meaning, at the same time it must be said that the development of this power over the external world may also lead to a sharper development of self-consciousness and all that it involves. There is a solidarity here between two movements : the movement of technology which takes us outwards, but in such a way as to affirm our power, and another movement which brings us back upon ourselves so as to discern ourselves as the source of this power. This double movement has been particularly easy to see, it seems to me, in European thought since the seventeenth century. In a very curious way, it has often been those who were at the origin of modern science and technology who have also been the philosophers of conscience. At the same time as they contributed to the affirmation of man's power over the external world, man's control over his environment, they became sensitive to the inner force which is within man, the power of conscience as both thought and liberty. So, we see very well what technology can contribute on the side of culture, on condition that this solidarity is recognized ; the conquest of an increased power over the environment may well go together with a sort of inner conquest of thought and of liberty.

The roots of a new humanism

Thirdly, from the point of view of humanism, the development of this power evidently changes the significance of man's situation in relation to the cosmos. Instead of feeling himself

powerless in face of a more or less hostile nature — not wholly hostile, say partially hostile — man now changes his relation to nature and feels himself to be a sort of demiurge, a being called to modify the face of nature, and to modify it in a coherent manner according to the laws which he discovers. He does not, of course, modify it in a capricious or arbitrary manner, but in a rational manner, following, so to speak, the dotted lines written in nature herself. He draws a continuous line between the dots. Nature is not offered as a complete, penetrable whole, but as an invitation. Nature invites us to undertake an operation whose character we can at first distinguish only dimly, but as we follow the line we gradually find a design emerging. Naturally this is probably leading us to a new way of envisaging our relations with the cosmos, to a new vision of the cosmos itself, and, as a result, also to a new vision of man inside the cosmos. One might therefore say that here are the roots of a new humanism.

The spiritual value of technology

Finally, the fourth positive aspect of technology: from the religious point of view we may say that the technician mentality contains a dynamic aspect which seems to be closely related to the profound dynamism which is inherent in Christianity, which *is* Christianity itself. So much so that we may ask ourselves whether technology, even where it appears to be linked up with atheism, is not a deeply Christian phenomenon. But I do not mean by that, naturally, that technology is the direct consequence of the development of Christianity. It is understood that there are in man natural powers and that the development of technology is precisely the development of certain of these natural powers. Technological man only unfolds all these natural potentialities; in other terms, the enterprise of technology is certainly a work of reason. But we may still ask whether, taking a longer view, looking deeper, this sort of dynamism, this sense of movement, this "progressivist" spirit which dwells in us — especially this sense of duty of which we spoke earlier — are not all profoundly and secretly bound up with the presence in humanity, through the fact of the Redemp-

tion, of a mysterious dynamism which, in the last resort, is not that of reason but of grace. What could perhaps bring us to think this is the comparison between, on the one hand, the attitude towards technology which Christianity makes possible, and, on the other, that which could be taken by a Buddhist, for example. I said "could", and I use the conditional because I think it would be an exaggeration to interpret too precisely the Buddhist position, for it would not, as I understand, be impossible for a Buddhist to welcome technology. So I speak in the conditional, and perhaps idealistically, simplifying things too much. But I wish to refer to the attitude of retreat from the world. I must admit that after all this attitude exists also in Christianity in the form of monachism. I am thinking here rather of one who retires from the world into the desert. Even if he goes to live in a community, he nevertheless seeks the desert as a place opposed to the world. The significance of the word "desert" has a negative aspect — that of retreat, renunciation. And curiously, the desert spirit appears as renunciation at two points : renunciation of goods — and all ascesis is here, that renunciation which goes as far as possible in reducing the "biological" claims, by fasting, for instance ; and also the renunciation of family, and thus of propagation of life. It seems that here, in the family and in the fabrication and use of goods, are two roots of social life : the family society and economic society. It consequently appears that monastic life defeats social life and perhaps resolves the problem of social life in an original way by breaking, so to speak, these columns on which society and social life are supported. However this may be, there is in Christianity an attitude of retreat from the world, and, logically, one should expect this attitude to translate itself on the technological plane by a refusal. But there is no need to go into all this, it is not worth while ; it is a distraction in the Pascalian sense — it distracts us from the essential matters. Obviously, we can see the extremely great spiritual force of this attitude. Even if it is true that there is a spiritual quality in technology, why should we make this detour, if it is possible to go straight to the essential, if we can go straight to God ? Why should we pass through the world and through activities of the world ? It is a kind of useless detour, even if it has

some value. And what exactly is this value ? Here I think of a phrase of Kierkegaard's : "It is a great thing to renounce one's dearest wish, but it is an even greater thing to go back on one's renunciation." He said this in reference to Abraham's sacrifice. God asks Abraham to sacrifice his son. He accepts, and then, just when he is about to sacrifice him, the angel restrains his arm. In a way, it is perhaps a finer thing for Abraham to obey God the second time than the first. It was doubtless very hard for him to give up his son, but once he had made this sacrifice, it was perhaps still harder to behave as though the sacrifice had not been necessary. So, the second sacrifice was more far-reaching than the first. It was a greater thing to return to his dearest wish when he had once renounced it. Is this not what we mean in Christianity ? There is certainly the movement of withdrawal from the world expressed in the monastic vocation, but there is also the reverse movement which is a return to the world ; only it is a return, a movement, which in a sense contains within itself retreat. This is expressed very well by St. Paul : "Having nothing and yet possessing everything" (II Cor. 6 : 10).

III. THE TECHNICIAN MENTALITY AND CHRISTIANITY

Two successive religious attitudes

Finally I must come to a conclusion. It seems to me that the problem posed to the Christian life by the technician mentality is that of a modification of religious attitudes — or in any case of certain of them. To simplify, it seems to me that there have hitherto been successively two religious attitudes and that there is now a third taking shape. When I speak of religious attitudes, I naturally do not look at the religious *content*, but at the way this content is taken up in a human psychology, and lived concretely. The first model was an attitude in which man discovered himself in the presence of the sacred, because man lived in a natural world which to him seemed stable, given once for all, with its laws. This nature was perceived as mysterious, as the sign and the receptacle of the divine power, and

God was conceived as the master of nature, as the planner of the world. It was somewhat the figure of "God, the emperor of the world", dominating the world and consequently dominating man himself. Man then had only to put himself in God's hands, committing himself to God and expecting God to give him all he needed. A second form of the religious attitude, which is moreover much more recent, is that of interiority, of a return to interiority. In the first attitude, man is in a sense open before nature ; it is outside himself that he seeks God's sign. The second attitude is the attitude in which man seeks the presence of God and God's sign within himself. This attitude developed just at the time when conscience was reflecting upon itself. It was established in a period which coincided with the discovery of the *cogito*, of conscience, in European philosophy, a discovery which is also related to the first flight of the modern scientific spirit. Only, that interiority is in a sense an insular interiority, a conscience which discovers itself in its nakedness, in its autonomy, which sees itself as situated outside the world. We must think here of the great rationalist philosophers who tried to express just this autonomy of conscience, of thought which is only thought, and particularly of the philosophy of Spinoza, where interiority is included within a framework of pantheistic metaphysics.

The synthesis between "realism" and "idealism"

But it seems to me that we are now entering upon another elaboration of the religious attitude, linked with an evolution of culture itself. This is precisely that we have discovered that conscience is not insular ; in a way, we have succeeded in bringing about the synthesis between a conscience which is purely receptive in relation to external nature, and a conscience turned in upon itself, finding in itself the key to the world. We are trying in contemporary culture just to find this synthesis between what we have called "realism" — naive realism at least — and what we call "idealism", the conscience which is purely a spectator in the world, and the conscience which is origin and source of the world. And this synthesis is certainly connected with the notion of action. It is bound up with the notion of

a dynamism of conscience, which is only an *openness* to the world, which is not therefore pure receptivity, and which is not creative either, but is one with the world, and one with the world in the unfolding of its own project, consequently in action in the developing of its interior potentialities, of the dynamism which dwells in it. We are trying to express the mysterious connection between the potentialities, these powers for action which we bear within us, and the potentialities that are in the world. We find a complementariness between nature and spirit. We find that there is a movement of the spirit towards nature and a movement of nature towards the spirit, and in contemporary philosophy the term dialectic — used, it is true, in all kinds of senses — is often taken to try to express, more or less, this complementariness, this circularity between spirit and nature. This new interpretation of conscience is intimately related to the development of the technical enterprise. We see very clearly the correspondence between this philosophical interpretation and the experience of technical man of himself. This new interpretation, being thus related to a new experience, will certainly give occasion for — and is already beginning to give occasion for — a new religious attitude in which it will certainly not be in the feeling of the world as sacred that man will try to find the sign of God, but rather in himself. However, it will no longer be a question of an insular and closed conscience, of a subjectivist spirituality, but of a conscience which discovers in itself the profound dynamism of action. The presence of God is to be discovered, of course, as within the soul, but it is to be discovered as the profound source of action, as the very root of this dynamism of which our undertakings each day bear witness.

The Christian hope gives its true meaning to the technical enterprise

On the other hand, what faith gives us is not only a grasp of the real nature of this dynamism but also a grasp of its true finality. I was saying just now that the project of technology is a project which remains indeterminate, whose finality remains invisible, and which consequently is somewhat formidable, even rather frightening. We do not know where it

will lead us. As soon as the immanent dynamism of this project is interpreted as it may be, as it should be, from the point of view of the Christian faith, then the finality will become clearer too. Not that we shall be able — as at a spectacle — to see what is going to happen, but in this sense that we shall acquire confidence that it is leading somewhere, and that is finally to the peace of God. In other terms, it is finally Christian hope which gives its true meaning to the operation, to the technical enterprise itself.

To express all this in another way, I would say that there is a *logos* at work in the world of reason and technology, and that this *logos* exposes us to the risk of nihilism. This *logos* has a meaning for itself, but it recognizes that finally this meaning is in some measure exhausted in the very expression of it. In other words, there is in this life of the *logos* a circularity by virtue of which it may appear to itself to be totally expressed, while at the same time it discovers in this very expression that there is nothing beyond the expressing. It discovers that it is at bottom empty, that at bottom it is nothing, that this pseudo-presence of itself to itself is at bottom nothing but an absence. It is thus inhabited by a sort of nihilism. Faith and Christian hope promise man freedom from misfortune and in particular deliverance from death. But we may ask ourselves if there may not be an interpretation of this death which might be the following : "to be delivered from death" could mean "to be delivered from non-sense, from the non-sense of nihilism, from the non-sense of the *logos*". What the Christian faith reveals to us is that the work of man goes beyond itself, that it is assumable, and has in fact been assumed in a movement which surpasses it, and which links it to the very life of the totality, the life of the totality which is quite simply the very life of God.

Science and Technology in God's Design

Bernard Morel [1]

Introduction

Is there a connection between science or technology and God's design, at least as far as this design has been defined by the thought of the Church ? Is there a connection between Holy Scripture, the source of the thought of the traditional Church, and the contemporary scientific and technical world ? If we answer no to the question, the case has been heard and there is no more to be said. But it is our view that since the Church has always transmitted Christ's message through the languages and great currents of thought of the day, we must now give theology the technical and scientific language suited to our age. There is a connection which we postulate *a priori* between what we call science or technology and God's design. We must specify this connection. I want to make four introductory remarks.

First, the determining of this connection is a particularly ecumenical enterprise. Indeed, the confrontation of the Church's thought with that of the contemporary world, since it poses problems common to all confessions, enables theologians to embark upon a field of thought which, by its novelty and urgency, should shake certain traditional antagonisms, and prepare the way for a collaboration which the impasses of the classic controversies had hitherto impeded.

Secondly, the relations between scientific and technical thought on the one hand and theological on the other are not reversible. Science and technology can develop without the help of theological thought. On the other hand, theology is not able to borrow from current thought, whether scientific or technical, the elements which will allow it to communicate God's purpose

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to people of our time. This means that theology cannot be indifferent to the development of scientific thought. Not only must it try to use the language, but theology must be informed by scientific thought, even though this informing causes some modifications in certain of its classic concepts. It is not a matter of changing the nature of the deposit entrusted to the Church by the apostles, of course, but of making it yield interest by taking the evolution of thought into account.

Thirdly, this confrontation shows that between theological thought and scientific thought there is a certain contradiction, not an absolute contradiction, but elements of diversity which mean that what is axiomatic for one is not reducible to what is axiomatic for the other ; at the same time, there are certain elements in common which make it impossible for theology to ignore scientific thought. This contradiction develops in practice into a dialectic wherein the opposition of the elements of identity and diversity develops according to a history on which theology *par excellence* could give evidence.

Fourthly and lastly, this relative diversity and identity between theology and scientific thought evokes the classic notion of analogy, which here again is still fundamental. Analogy reminds us that the difference between theological thought and scientific thought is essential, and that the identity is only in a certain respect. It is this "certain respect" which must be specified. We shall attempt this, not by an external description of the process of scientific and theological thought, but by attempting a theological formulation which takes scientific thought practically into account. It remains that the notions which we borrow from scientific thought only apply by analogy to theology, so true is it that theology cannot be a science in the strict sense of the term, since we cannot in theology give the counter-proof nor the mathematical verification of what we put forward ; and this because the object of theology is the mystery of God, that is to say, God's relation to the world of his creation, and within this creation, man's relation to his Creator and his God. This mystery by definition eludes any univocal specification ; the introduction or application to theology of a scientific language tends to equivocate this language out of respect for God's transcendence. So the remarks which I am going to

contribute now have a personal character which, I hope, will provoke a discussion, a discussion which seems to me all the more necessary since the church I represent has not defined its position either clearly or unanimously.

I. SCIENCE AND TECHNOLOGY

The notion of information

We have tried to define science and technology not extensively, that is to say, from outside, but rather comprehensively, that is, from inside, by borrowing a particularly useful notion from cybernetics : the notion of information. Information is a notion which, to be thoroughly understood, would necessitate mathematical development which has no place at this meeting and of which I should be quite incapable. Let us simply recall that this notion, which is older than cybernetics properly so-called, makes it possible to embark on problems of the philosophy of science at the point where several specialist scientific and technical fields converge. This fact makes it particularly useful for an encounter with theological thought.

Maxwell's demon

In order to make clear what I mean by information, I shall use two scientific myths. First, Maxwell's demon. This is a well-known myth. Let us imagine two containers communicating by means of a small window ; in each of these containers there is the same gas. In the container A, the gas is at a temperature of eighty degrees, and in the container B it is at forty degrees. If we let this system formed by the containers A and B work by itself, that is to say in the sense of the greatest probability, at the end of a certain time, especially if the two containers are of the same volume, we shall see the temperature equalizing at something around forty degrees. In effect, the rapid molecules of container A will pass into vessel B, and the slow molecules of vessel B will pass into vessel A, so that the mean speed of the molecules will be progressively equalized in the two containers, and consequently the temperature nearly the same. Following

the second law of thermodynamics, we can say that the system, in evolving towards its most probable state, has evolved towards its state of maximum entropy, entropy here being a measure of disorder, of anarchy, of the levelling of the structures to which, according to the laws of statistical probability, every physical system tends if left to itself. We shall not say more about this notion of entropy which is in itself a very difficult notion, except to remark that information is measured in terms of negative entropy, or more accurately, that its mathematical definition is the same as that of entropy, but of the opposite sign. That is what we are going to show by placing a little demon (Maxwell's demon) at the window through which the two containers communicate.

The gases in the two containers are at the same mean temperature of forty degrees. The little demon has received precise instructions : when a fast molecule in vessel B appears, the window must be shut ; and conversely with vessel A : only let slow-moving molecules pass into vessel B and keep back all the fast ones. What happens ? Well, we observe that the temperature of vessel A rises in proportion as that of vessel B falls. The little demon has thus diminished the entropy of the system which, at the start, was maximum : the state of the system has gradually evolved in the direction of an increasing improbability. Maxwell's demon has thus caused entropy to retreat by exercising a discriminatory action upon the evolution of the system. He has introduced what we call information into the system of negative entropy. It is by the information that he was instructed to introduce between the vessels A and B that the demon succeeded in constructing a state of minimum probability.

The myth of the stream

This is only a preliminary approach to the notion of information, which we must try now to define further, from the technical point of view, by means of a second myth, the myth of the stream. Imagine a stream rising in a high mountain and flowing through a plain into a river which will carry its waters to the sea. This stream plays a big part in the life of those who live along its banks, who count upon it to irrigate their fields, and

live in dread of the floods which periodically inundate all their towns and villages. The riverains have noticed that they could not count upon a regular and fixed flow. They have tried to measure the determination of the flow, that is to say, what they could count upon, and they have observed that the determination of the flow did not exceed a rate of five in 3,000, the remainder measuring the *rate of indetermination* or of *contingency* corresponding to the hazardous variations of this flow, and consequently to the legitimate fear of the riverside inhabitants. In order to increase the rate of determination, that is, to diminish the rate of contingency, the riverains had the idea of canalizing the river and installing a system of sluice-gates and reservoirs which would protect them from catastrophic floods and droughts. Thus they diminished the rate of contingency to approximately a third, in other words they augmented the determination rate to 2,000 in 3,000. But this is still a contingency rate too high for their safety. What can they do ? The stream is completely canalized, so the determination rate cannot be increased. The only thing possible is to introduce a new factor, organization, and to diminish the contingency rate by organizing the river. The riverside dwellers set up observation posts in various places to watch the flow of the river, to measure threats of flood or of drought, and to inform a central post, which takes such decisions as will avoid catastrophes and sends messages to the various sluice-gates so that the flow may be kept as regular as possible. By organizing the river, that is to say, by introducing information which they circulate throughout the system, they have succeeded in reducing the contingency rate to five in 3,000. Information here represents the measure of order which the mind of the riverains has introduced into the river so that, its course being properly regulated, its dangers may be averted and its promises be kept as far as possible.

This second example introduces us to the notion of information particularly as it is related to cybernetics. The word cybernetics comes, of course, from the Greek meaning pilot. Cybernetics is the art of pilotage. The information gathered at different points along the river is communicated and sorted at a central pilotage post, the brain of the system. From the control post it is then distributed to the different effective organs of the

system. This example shows that information is not only a measure of order that man can introduce in order to assure his power and defend his liberty, but also a means of acting by anticipation, that is, of foreseeing phenomena which threaten danger. This action by anticipation is one of the most important aspects of cybernetics, showing that information must be included in the time of events and the duration of phenomena, and not only from the point of view of abstract mathematics. It shows how experience of the past can be used to prepare the future.

A third remark: the notion of information is not peculiar to man but is a universal phenomenon found wherever there is an encounter between a living organism and its physical surroundings. It is on the frontier between animate matter and inanimate matter that it appears. When an organism perceives a variation in its surroundings, this variation represents a menace to its internal equilibrium and consequently to its life ; the organism reacts at once upon itself and upon its environment in order to protect its equilibrium with its environment. Its perception, and consequently its reaction for adaptation and defence, in themselves constitute information in an elementary form. And perhaps information existed already on the infra-biological level of the heterogenesis of physical matter, where the combinations were in preparation which from the large organic molecules were to make the first living cells.

Man as manipulator and communicator of information

The more complex the organism, that is to say, the further it deviates from the mean, from the probable, the more information it contains. And in this respect the human species, because of the complexity of its structures, is certainly the creature which contains most information, and consequently, at least on the macroscopic scale which is ours at the present time, the most interesting creature to know and the most attractive, the most astonishing, and the one which should arouse our deepest admiration. Not only do the organisms which deviate from the statistical mean contain information, but they are also capable of it ; man is certainly the greatest manipulator of information of all the animals.

It is to be noted that man is not only capable of manipulating information, but he is capable of increasing the stock and of manipulating it socially ; symbolizing it by the terms of language, he can communicate it, and in this communicable state, information exists almost outside and independently of the individuals who manipulate it. The ants certainly have techniques which indicate that they have the capacity for information, but their techniques have been the same for centuries. Man, however, improves his techniques, his stock of information becomes more extensive, the experience of parents benefits the children, and human memory is not only individual but collective.

This point is extremely important, because it shows that, in the scale of organized beings, man has an absolutely unique position which has a moral significance. In fact, through the manipulations of his information, man can introduce new structures into the universe, and thus work at the evolution of this world to a state of lesser probability, but he can also, through his information, introduce disorder into the universe, un-make structures and bring certain systems back to a state of greater entropy. Thus man is revealed as both a great constructor and a great destroyer, because he has this possibility of choosing the ends he pursues and the means he employs, and consequently has also the capacity to deceive himself. The more the organism is structured, that is, of an improbable complexity, the more autonomous it also is, and this autonomy, which opens the door for him to the idea of liberty, opens it also to the idea of morals.

II. GOD'S PLAN

God's information and the myth of creation

Science, which is the search for and the accumulation of information, and technology, which is the manipulation of information, are not without some analogies with the first story of Genesis, the myth of creation, which we find in the first chapter of the Bible. Analogies only, for the first chapter of the Bible, like Holy Scripture as a whole, is primarily a hymn of

praise from man to his Creator, whereas the search for information does not necessarily lead to the idea of a Creator. An essential difference, but nevertheless also a resemblance, and the resemblance is the following : the biblical narrative says clearly that in the beginning everything was without form and void, *tohu-vabohu* in Hebrew. This universe in chaos is the universe in a state of maximum entropy, where everything is in its most probable state of maximum disorganization, where there is neither structure, nor differentiation of levels of energy, so that not only is life impossible and there is nothing and nobody to perceive anything whatsoever, but there is not even anything to perceive ; chaos represents for thought an equivalent of logical non-existence. Did God create everything out of nothing, *ex nihilo*, or out of chaos ? Theologians can discuss this indefinitely ; it seems to come to the same thing, and human thought cannot go further back in time beyond the idea of chaos which already represents nothingness, and to go back beyond chaos is to go beyond the imaginable.

In the beginning God said, "Let there be light, and there was light." God spoke and it was so. God created by means of his word. The word is here the analogy of the information about which we have just been talking. God introducing information into the universe in chaos created structures, developed a process which from structures to more complex structures led the universe of chaos by ways of physical and biological evolution through to man, the most heterogenized creature. The entropy of the universe decreased in proportion as God's information was introduced into chaos ; and this entropy became least in man at the climax of biological evolution, the creature through whom God crowned his creative work on the sixth day. The six days of creation have evidently no common term with our universe's billions of years. But in this poetic summary we discover an intuition of the direction of evolution. Starting with light, the first fundamental structuration of chaos, God's information leads evolution towards its at present most perfect term — man.

Thus the very notion of information helps us to understand better theologically the intention of God, who in creating the whole universe by his word sought to give himself a *vis-à-vis* to

whom he could talk and who would consequently answer him, a responsible *vis-à-vis* who, discovering in his turn all the riches of creation, would discern the plan of the Creator in order to submit himself to it. Perhaps it is through his capacity for information that man is in the image and likeness of God; indeed it is through his information that man can respond to his Creator as a child to his father, and that he can intervene in the world in a manner which has something of the creative quality. Man is certainly incapable of producing structures out of nothing, but at least he can intervene in processes in such a way as to make them evolve towards a less probable state which may be more to the glory of God, and thus, through his science and his technology, make all creation sing the praise of its Creator.

Human information has religious significance

It seems throughout the biblical myths of Genesis that this was God's plan. Man is not put upon earth simply in order to go on living, but in order to extend his power. The names which man was to give to all the creatures which God made to pass before him, according to the text of the second chapter of Genesis, would be preserved not only in men's memory, but in God's. Human achievement is thus a sign of God's action in the world. Human information, or more accurately, the symbols through which this information is elaborated and communicated, have a religious significance. God takes human science and technology into account. He attaches a divine value to them in proportion as man is in his own image and likeness. It is in conformity with God's plan that man should seek to know all the secrets of the universe in which he is called to live and to increase his power, and that in this should essentially consist his responsibility towards the Creator. In as far as he uses his information intelligently, to create new structures in God's universe, he responds to his vocation as a man and collaborates (if that term is not presumptuous) in the creative work of God, in whose image and likeness he "scientifically and technically" is made. Freedom is in a certain fashion the corollary of power. God, when he created man capable of information, conferred upon him an autonomy of a special kind which

we call freedom, because it is in the ultimate analysis mysterious in the image and likeness of the mystery of God's freedom : something in man irreducible to determinist laws, and in which both the dignity and the responsibility of the child of God are manifest.

III. THE FALL AND REDEMPTION

The fall resulted from the misuse of liberty

The third chapter of Genesis reminds us of an unfortunately obvious fact. Man has not used his liberty with the sole object of glorifying God ; he has manipulated for his interest the information which he has mastered. This is not the place to develop this classic chapter of theology on the origins of sin. Man ought to use his information to manifest by intelligent co-operation his submission to God the Creator ; and man has not done so, or at least he has not always done so. Henceforth all the manipulations of information indicate, all at once and contradictorily, that man was created in the image and likeness of God, and so far his information is in conformity with God's plan ; but on the other hand, he manipulates this information in what we will schematically call egoistic interests, and so it is no longer in conformity with God's plan. Instead of collaborating with the universal heterogenesis which leads the world of chaos to the repose of the seventh day, he contributes to the universal homogenesis which leads the creation of the sixth day back to the original chaos.

Universal heterogenesis started out from chaos and ended with man, and now this special form of homogenesis which we call sin starts with man at the climax of the evolution of life, and returns through the whole creation to the chaos which is the end of the world, according to the laws of statistical probability (a generalization from the second principle of thermodynamics), which man aggravates by his misuse of liberty. I shall not give an example : they come to mind only too easily.

It is not only man's relations with his physical environment which are thus disturbed, but also his relations with his fellows. Mishandling his information, he does himself and others injury,

and this suffering which he endures or causes is a sign that by his sin he hastens his own destruction, confirming in some sort these words of Scripture : "The wages of sin is death."

Thus he tends to bring both himself and his neighbour back to the chaos from which he has been led. If, to speak metaphorically, "the grain of dust" is at the origin of human life, it is also at the end of man's existence. The grain of dust is the origin of human life, but not of the individual's life, for he was born of his parents and developed from a living cell. On the other hand, dust is the end of the life of every individual, but not of the human species, which by reproduction pursues its way towards the seventh day of creation. From now on this progress is accompanied by a feeling of bad conscience : man is divided between his sense of power and his desire to use it for generous and useful purposes, and his sense of inadequacy, incapable as he is of avoiding temptations to egoism, that is, to selfish power. The struggle to live, inevitable wars and bloodshed, have a meaning in terms of good and evil which scriptural revelation transposes into terms of sin.

The relation between God and man is also affected by this misuse of liberty. Whereas between God and man these relationships should be harmonious, they are now dialectical. An element of contradiction has entered in, just as man's good will comes into conflict with his evil will ; the love of the father watching over his child's happiness becomes the irritation of the judge who cannot endure the sin of his creature. The image of Adam and Eve driven out of the garden of Eden shows how God's curse weighs upon the manipulations of human information. Henceforth man has no longer a simple relationship with his Creator ; the disturbance introduced by sin shows itself dialectically in human information which is at once a sign of God's blessing and a sign of his curse upon man and his activities.

Redemption through Christ, the alpha *and* omega *of creation*

The Bible from end to end shows that God does not abandon man who breaks with him ; he comes to meet his child to rescue him from the consequences of his error. This story of God who

goes to meet men is told prophetically in the Old Testament and historically in the New. Christ, the Son of God, comes to reforge the link broken by sin.

There is a divine dialectic of immanence and transcendence : immanence, the force through which God approaches his creation, establishes himself in her, becomes incarnate in the person of the Son, and makes himself present to the world, and transcendence, which is the contrary force whereby God, judge and saint, withdraws from men, abandons them to their sins and to death, leaving them to return to chaos. This dialectic attains its highest point of contradiction in the mystery of Christ, in which the forces of immanence and transcendence oppose each other to the point where God becomes man while remaining God, the All Other in the humanity of Christ. The dogma of the "two natures" defined by the Fathers of Chalcedon admirably illustrates this contradiction : the person of the Son is incarnate in human nature in such a way that in Christ the divine and human natures are closely conjoined but not confused. They are united "without separation or division", but also, according to the famous formulation of the Chalcedon definition, "without confusion or mixture" ; the divine nature is at once immanent and transcendent in human nature.

Christ is the mystery who counteracts the fall and restores to man the possibility of reunion with God and collaboration with the work of creation, because he is, supremely, the crown of creation ; he actualizes perfectly "the image and likeness of God" in which and for which man was created.

He is the *alpha* of creation because he is the Word of God, that is, he is the Information through which God brought the world out of chaos ; he is also the *omega* of creation because he actualizes the perfection for which God has created all things and set man at the head of his creation. His cross, on the other hand, shows that he knows death, not only as the sign of God's judgment, but also as a way to eternal life. When he rose again, he delivered, through man whose nature he had assumed, the whole creation from the fatality of death. If God created life, it was not so that death should carry it away for good. The dialectic between life and death at the end of the universal heterogenesis and homogenesis in which it seemed that the

destiny of man was confined, this dialectic was firmly inflected in the direction of the triumph of life. Therefore the *alpha* and *omega* of creation, in the heart of human history, accomplished everything ; his earthly work and existence remain the supreme evidence.

IV. SCIENCE AND TECHNOLOGY AND THE PERSON OF CHRIST

The reconciliation of science and technology with God

Christ is not only a historical person whose individuality is confined to one human place and time. As he himself promised his apostles, he remains alive throughout the history of man through the presence of his Spirit ; or, more accurately, through the Holy Spirit he himself remains present with men until the last day when, by his coming again, he will complete their history. Thus he is the perpetual mystery of human history, living in his Church which in some sense is itself Christ, living in the inner life of the faithful who through their spiritual life are also in a sense Christ, living everywhere in the world where men struggle and hope, and gathering the whole of humanity into the humanity of his existence. Today still Christ, in his two natures as defined at Chalcedon, reconciles humanity with God, and in this humanity are comprised all the values which have composed it through the ages, in this instance the science and technology of our epoch.

All that human information stands for is assumed in this mystery of Christ's humanity ; modern science and technology were already present in Christ dying on the cross, and are therefore reconciled with God. Of course, scientists and technicians remain sinners in their manipulation of information, but this sin does not deface science with shadows that will cast a veil of pessimism over its future. If Christ has truly reconciled men with God, and if he is himself humanity in its completion, Christ will at the end of history be the conclusion of all this human search which today we call scientific. He is the *omega*, not only of God's creation, but also of the hope which men try to make

real by their scientific and technical work. The dialectic of sin continues, but the grace of God will triumph over man's sin. The technician and the scientist may still be divided today between their desire to follow God's design and the temptation to follow their own ambitious designs, but they know that a hope has been extended to them that nothing and nobody, no power in this world, can destroy : the victory in the end of the Creator, through Christ, over all that could deflect creation from its purpose, which is God's peace.

The eschatological significance of scientific research

This optimism has thus a fundamentally eschatological significance. Neither today nor tomorrow will man know how to handle his information in a way truly conformed to his vocation as a child of God ; he will contrive to make mistakes, to destroy his environment, to wound his neighbour, perhaps even to kill himself. But if we look beyond the horizons of our mathematical foresight into the mystery of God's promise, we should face the future with confidence : not only is God stronger than all the dynamisms which cause us to break with him, but in man's technical and scientific effort he finds collaboration of a kind which makes a decisive contribution to the completion of his creative work. Therefore, if we really believe in Christ, we must believe that nothing in the world, even in the heart of man, can compromise the plan which God has had for all eternity.

There is a dialectic between man's collaboration and non-collaboration with God which still remains, for it is certain that the scholar pushing his scientific research is not necessarily aware that he is working at God's creation. Science, as we said at the beginning, develops independently of the faith of the believer and of the theology of the Church. But the Christian scholar has this advantage over the non-Christian scholar, that he knows not only what he is doing in the immediate present but also in relation to the most distant future. He knows that in spite of the forces of selfishness which continue to be at work in the intentions of his will, he will yet be a real fellow-labourer if he trusts God to fight his spiritual battles with him.

He is very often obliged to take part in the works of destruction which men cannot help producing. But through all the manifestations of violence, of war, in short, of destruction, in spite of all these forces that men unleash so that death remains their most cruel menace, he knows that Christ is the *omega* of his research.

More than ever, in the confrontation of science with theological thought, the mystery of Christ as defined at Chalcedon is fundamental. He is the foundation of the hope of scientific research and its technical applications, provided that the eschatological bearing of the Chalcedon definitions is underlined. The Christ to whom we look is not only a man who lived nearly two thousand years ago ; he is the Mystery of God, who comes from the end of time to meet man's hope and his scientific and technical research, so that this research may be a sign of Christ's second coming, and take up the universal praise of creation, passing from this world of tensions, struggles, and conflicts into the peace of the seventh day : God's peace, man's peace, and the peace of all creation.

Modern Science and the Christian Faith

F. Russo, S. J. [1]

It is no new thing for Christians to look at the development of science and consider its religious repercussions. In the beginning the questions were limited in range and concerned the origin of the universe and of man, particularly the interpretation of Genesis, and more recently the origin of life and evolution.

These questions have not lost their urgency, but we tend to look at them today more broadly and more searchingly than in the past : what comes to the fore in the science-faith debate is no longer so much the particular problems themselves, as the whole question of the destiny of science and its place in human existence and consciousness. Ultimately it is this global and more fundamental question which poses the more serious problems for our faith. We shall try here to look at the major aspects of this problem.

For this purpose, before we deal directly with the relationship between science and faith, we need to draw a broad outline of modern scientific research. For we have not as yet measured all its dynamism and all its significance.

I. THE PURPOSE AND NATURE OF SCIENTIFIC RESEARCH

In its intentions and in its methods, science is beginning to show increasingly *definite* characteristics, which we are being rather slow to recognize.

[1] The author of this article participated in the WSCF — Pax Romana Consultation. The article is reprinted from *Sciences ecclésiastiques*, published by the College of Jesuits, Montreal, Canada. It was translated from the French by Margaret House.

A. Science — the search for truth

Science has always been an attempt to reach the truth about matter, but in modern science this pursuit of truth appears in a guise which is in many respects new, and which makes a deep impression on our civilization.

Science as we know it today appears to be increasingly based on a *love of research.* By this we mean that the ideal of the scientist today is not so much the attainment and contemplation of truth as progress towards it, the strain of the whole being to achieve it. This change of perspective must be attributed in large measure to the fact that, whereas in the past one could believe that the truth about matter was accessible to whoever sought it, today it appears increasingly to be attainable only at the cost of an effort which is at the limit of human capacity.

It is impossible to over-stress this characteristic of modern science. Whether it is a matter of theoretical problems or of experimental techniques, nature yields up her secrets less and less easily. Immense efforts are made today to elaborate a satisfactory theory of the behaviour of the nucleus and of the nature of the elementary particles which compose it, or again, to elucidate the physics of solids ; in the experimental field enormous sums of money have been spent on the construction of great accelerators like that at CERN, in Geneva, in order to make an advance in the study of high-energy physics. How difficult it appears to be to get further light on the inner mechanism of life : what immense work is being done at the present time on the physical chemistry of the nucleus of the cell.

Sometimes we even wonder if we have not reached the limits of possible investigation, if some knowledge is not forever inaccessible. In the field of astronomy especially this impression would seem to be inescapable. But we must not give in too soon ; moreover, man — or rather, mankind, for there is no question of an individual science today — is not ready to give in. The passion for knowledge is too strong to allow science to halt in the face of difficulties. Thus in spite of serious set-backs, we do not hesitate to devote powerful resources to the mastery of nuclear energy and the fusion of light elements, which we

have only achieved so far in the more than brutal form of the H-bomb.

I think we are not betraying the secret intention of the scientist, or, to put it more strongly, the passion which animates him, if we see in it a response to a call inscribed in man's inmost self, urging him to "reveal" the truth about matter. Jean Ladrière expressed this admirably in an article on the meaning of scientific research (*Lumen Vitae*, 1960, no. 3), which I may perhaps be allowed to summarize :

> If science remains still to be accomplished it is because the *logos* of the world still remains a hidden *logos*. The revelation of it is barely beginning, and it is man's privilege to bring it about. We are face to face with one of man's fundamental responsibilities in relation to the world, of a dimension of his vocation which he is only just beginning to recognize. Certainly, man is not a creator in the full and direct meaning of the term. In this undertaking he finds himself presented with a *datum*. But this is a *hidden datum*. It must be explicated, brought out into the daylight. Science is precisely this — this process through which the world as nature finds its fulfilment and its apotheosis in the world as *logos*.

We have to reach this stage if we want to measure exactly what the scientific ideal stands for today. At this point science no longer appears as a minor or optional form of occupation on a par with a number of others. It appears as a *vital* activity which man cannot do without, any more than he can do without bread. It constitutes a task in which man possesses himself, frees himself, and knows himself, for the reason which we have just given, that it is his deepest vocation.

These few indications will, we hope, have helped us to understand the full seriousness and gravity which characterize the contemporary scientific task. Science becomes less and less an amusement, a distraction, a hobby, as it often was in the past. It appears increasingly to be a task from which man cannot escape, even apart from any useful results. More than ever, we can take as our maxim, "It is imperative that science should be". Does someone ask the scientist, why ? The scientist

is rarely a philosopher and will no doubt find it difficult to explain himself on this subject. But let there be no misunderstanding — as there sometimes is : the scientist's lack of skill in defining his ideal is in no way a sign that he lacks one, or is not devoted to it. On the contrary, it is because the dynamism of science is at the deepest level of the consciousness of contemporary man that it is so difficult to put it into words.

Now this design of scientific knowledge whose force and seriousness we have been discussing, is not the concern of a few as in the past. An ever-increasing section of humanity is becoming involved.

Pure scientific research, *basic research* which is not concerned with applying knowledge, has already assumed very large proportions, and requires not only scientists in the old sense of great creative minds, but scientific assistants and also technicians of various degrees of skill.

But beyond pure science, scientific truth makes itself known in our civilization through *technology*. The latter, indeed, should not be considered only as the pursuit of efficaciousness, of a useful result. It is also an *illustration of the truth of science* to the ever-increasing extent that it is applied science, science set to work.

Finally, thanks to *popular science*, which is constantly improving in quality and appealing to an ever-wider public, the scientific ideal is gaining ground, outside the world of scientists and technicians, among the mass of the population.

It is therefore no exaggeration to say that our civilization lives in a scientific atmosphere.

B. Science as an attitude of mind

We do not intend to give a detailed account of the scientific attitude. This analysis has, in any case, frequently been made. But what we essentially intend to do is something less often done, to emphasize how far this attitude of mind is *determined*, and this is new in many respects, in relation to the old ways of approaching positive reality, and *differentiated* from the philosophical and religious attitudes from which it was not until recently clearly distinguished.

It is important also to ask on what grounds the scientific method can justify itself. Truth to tell, these have hitherto been rather thin on the speculative plane ; science was primarily justified by its success. In other terms, science has furnished its proofs rather than justified itself, properly speaking. This state of affairs is not without its consequences.

On the strength of its success, science has tended to claim sometimes rather exaggerated virtues for the scientific method. For lack of sufficient consideration of the cause and even of the nature of its successes, many men of today have come to think that science can solve all problems, or even that it offers the only valid approach.

II. THE PLACE OF SCIENCE IN LIFE AND THOUGHT

It is of supreme importance that the scientific enterprise outlined above should be seen in its place among man's activities as a whole, and especially its relationship to religious life and thought. This is an urgent question which has not hitherto been undertaken with the seriousness and attention which it requires. Some tend to deny science the place which is its right : heirs to a narrowly conceived classical humanism, "literary gentlemen" indifferent to scientific values, and sometimes, let us face it, theologians who are disquieted by the growth of science which they see as the enemy of faith. Others take the opposite view and tend to give so much importance to science that no room, or not enough, is left for other activities of the spirit.

We must go beyond these inaccurate views and fruitless comparisons — which is possible, especially if we recognize that a relatively new form of mental life is tending to assert itself : situations or distinctions, or, on the other hand, too simple harmonizations of mental attitudes are being superseded by a state of differentiation, in which we shall have to accept tensions which may be slightly uncomfortable but will be ultimately beneficial, and will lead to the purification and widening of perspective that facilitate possibly less easy but ultimately more fruitful and accurate syntheses.

If we limit ourselves to the problem of the relative position of science and faith, we find the following principal points of view in which science and faith appear in duality, and to a certain extent in tension.

We must tackle them honestly, as definitely as possible, bringing all available light to bear upon them. We must not be content any longer with the vagueness, uncertainty, and plausibility which we have "made do with" for so long.

1. Whereas the truth of faith dominates time, is truth, truth definitively acquired, if not in all its developments yet at least in its essential affirmation, scientific truth is a *progressive truth* which is ceaselessly correcting and completing itself. Faith and science are each right in their own order. But it will be understood that, in a world where the ideal of such a progressive scientific truth is increasingly accepted, it is perhaps fitting that we should take more trouble than in the past to justify the invariable character of the truth of faith. I do not intend to produce this proof here ; I only go so far as to state the problem and to observe that, whereas the scientist needs to be very careful not to claim that progressive truth is the only truth accessible to man and worthy of his intellect, the theologian on his side must beware of so presenting faith that the pursuit of progressive truth by the scientific method appears to be an occupation without meaning or importance.

2. Science is interested primarily in matter, in things. Even when it concerns itself with man, it does not penetrate his subjectivity, his essential being, but only to the point where he is open to analysis as a *positive reality*. Furthermore, the interest of science aims at the *detail* of matter. Science certainly is not without regard for synthesis, but this synthesis could only be valid for it if all the details were included and integrated.

This is not the primary aim of religious truth, which enlightens us first about our destiny and the meaning of our existence. For this reason the Christian revelation did not need to wait for the theory of relativity nor for quantum mechanics.

There is a duality of aim here which, of course, is not ultimately a contradiction, but which nevertheless deserves to be taken seriously. For unless we take care, the men of our day, pene-

trated with the scientific spirit, will soon be regarding the purely objective and *detailed* knowledge offered by science as sufficient for the understanding of man and of the world, all other interpretations being consigned to the category of childish and mythical explanations which belong to a bygone age.

Here again we must be on our guard, both against the facile views of certain scientists for whom the almighty power of scientific understanding is unquestioned, and against certain Christian thinkers who withhold the respect that is due to this objective and detailed study of matter.

We have not satisfactorily resolved the confrontation of the truth of faith and the truth of science when we have exposed the partial and incomplete nature of science's positive explanation. We must produce other views which will underline the legitimacy, the dignity, and the necessity of such positive knowledge, from the very standpoint of that conception of man proposed by faith.

In particular, Christian scientists must overcome this tendency to a bad conscience which too many non-scientists enjoy maintaining in them, a tendency which comes from the fear of leaving man and his faith behind when they begin to take an interest in matter, and still more when, as specialists, they devote the greater part of their energies to a narrow section of positive reality.

Certainly, in such work their sense of the human, their religious sense, may be in danger of deterioration ; but fundamentally this is not an inhuman position in which they find themselves, for in engaging upon it they are fulfilling their human vocation.

3. We now tackle a more radical aspect of the duality of science and faith, that presented by the ever-sharper neutrality and autonomy of the scientific enterprise. The further science progresses, the more it is concerned to protect itself from all compromise, to purify itself from foreign elements which might intrude into its procedure, and especially from the themes and arguments deriving from philosophy and from theology. These foreign elements may encumber it, impede its effort, and even put it onto the wrong track, as the history of science demonstrates.

The scientist of today is extremely susceptible on this point. He has increasing difficulty in bearing with the syncretism which particularly rejoiced the learned men of the seventeenth century, Newton or Descartes, for instance, to quote only the very great ones, who brought in the hand of God at every verse end.

Again let us repeat, with an emphasis for which we apologize, but which seems appropriate if we are to reach the most obstinate minds, that if this state of affairs does not in itself constitute an obstacle to faith, it is nevertheless true that it cannot fail to raise a problem, at least psychologically.

One must be honest enough to recognize that among Christians who are alive to the possible effect upon their faith of the development in themselves of a scientific mentality, there is a disquiet which is due to the lack of any apparent connection between science and religious matters, to the desacralization of the world resulting from the spread and growing prestige of the scientific explanation.

Can we say that "classic" religious teaching has a satisfactory answer to this difficulty ? That is not certain. Too often it seems to us to beg the question, to answer it superficially, for lack of having really faced it in all its implications.

In a world increasingly penetrated by this "neutralist" spirit, we cannot be satisfied with appealing to the indubitably essential distinction between the orders of knowledge. This distinction is not as simple as it is often said to be. It must be made clear in a sufficiently expanded and profound argument that, on the one hand, this attitude of neutrality is "methodologically" necessary and of the highest importance for reaching the positive truth about matter, and that it only attacks a "sacralization" of the world which ultimately is not essential to faith, but that, on the other hand, it only constitutes a "moment" in the complete knowledge of reality. A full understanding of man and of the world must be broader and deeper and go beyond scientific thought, and neutrality must be abandoned without any suggestion of an abdication of the intellect in the highest and most authentic sense of the word.

In such an analysis we must beware of certain facile purisms which are to be met in the camp both of the philosophers and

of the scientists. It is here that a work like that of Père Teilhard de Chardin finds its meaning and its justification. In spite of certain debatable philosophical opinions, he was a scientist completely familiar with the positive method, who yet sought to go beyond the neutrality of pure scientific knowledge, demonstrating admirably how in the heart of science itself there can be heard a call to go further.

If we were unable thus to indicate the place and importance of scientific effort, we should see faith giving way before a domination of the scientific spirit which would soon become a religion. Do we not see this happening today in certain circles, where a curious landslide makes this scientific neutrality become the basis of a new faith, and claim to constitute in itself a complete vision of the world and its destiny ? A global *élite* of men trained by science and technology may well come to believe that, concretely, only the progress of science can answer the questions, religious ways having only a secondary importance henceforth. Religion could still be respected, even esteemed, under these conditions, but only as a consolation, as something that feeds the affections, and no longer as the light and guide of existence.

Going deeper into the modern scientific attitude, we find it dominated by a *rationalist* hope of a perhaps hitherto unmeasured dimension. This hope is for an entire mastery of truth, a total reconstruction of the world by the human spirit. A certain kind of rationality, of a vigour and intensity never attained hitherto, tends to pass into everybody's life, to become a live formula for existence. Present-day science may be far from this ideal, but let us make no mistake about it, its soul and driving-force are here.

We need not dwell at length on the consequences of this attitude for the life of faith, which could never be satisfied with the evidence of reason alone.

Once again, faced with this situation, we must beware of facile solutions, but we must not be disturbed. Let us see in this state of affairs an invitation to make a better presentation of the exact nature of faith : faith does not despise reason, but faith has good reasons for presenting man with wider horizons beyond strictly scientific rationality.

We should need to extend these analyses if we wished to present a complete view of the contemporary duality of science and of faith and of the harmonizations called for. But the three views which we have looked at will have sufficed, we think, to show— and this was our essential objective—that the confrontation of faith and science cannot be treated lightly, and requires notably an exact understanding of the nature of the scientific objective.

We are certainly faced with a difficult and delicate question, which can only be answered with a very serious effort.

It is possible that many of those who encounter the scientific mentality, whether they are involved directly or indirectly in scientific work, particularly if they are responsible for bringing the Christian message into circles influenced by science, have not yet seen sufficiently clearly all that must be conscientiously *overcome* so that the full *openness* of mind which is a condition for the acceptance of faith shall be safeguarded or rediscovered, an openness which in many respects science is in danger of compromising.

This task — all that has just been said will have sufficed, we hope, to make this understood — is not only a matter of defence, and does not consist only of putting people on their guard ; we must more positively set before the Christian of today an *equilibrium* of the life of the spirit which will be new in this sense, that it must include an acceptance without reserve and without timidity of the scientific attitude, however much it may at first sight appear to be opposed to the attitude of faith. This acceptance, though it certainly implies an ordeal, will be ultimately beneficial for faith, precisely because it will have imposed this ordeal. But to operate in the direction willed by God, this acceptance must include the condition of clearly setting out the exact possibilities of the scientific method, which could not claim to contribute all the truth, nor constitute the only valid behaviour of the mind.

Contemporary man sees himself finally invited to an intellectual "way of being" more differentiated than in the past. Far from seeing a danger for faith in this new situation, we see, on the contrary, the possibility of a purer, more personal, more courageously and fully adopted, faith.

Faith and Technology

Jean de la Croix Kaelin, O.P. [1]

Introduction

The thoughts which follow are an attempt to define, from the Roman Catholic point of view, the Christian attitude to the technological revolution of the modern world. When I say "the Christian attitude", I am not thinking of the attitude which Christians have in fact taken. We are all well enough aware of the oft-deplored divorce between a certain so-called Christian mentality and the post-Renaissance scientific mentality. I shall therefore waste no time over that. What interests me is the Christian attitude as it issues from the vision of man given us by the Catholic faith, a vision which bears not only on the essence, but on the existential situation, of redeemed man in the world.

I

Man's double finality

Man receives a twofold call from God. The one, which proceeds from his very nature, consists of filling the earth and subduing it and having dominion over every living thing. The other, which proceeds from grace, makes him a son of God and brings him into intimate relationship with the Divine Persons, sets him on the path towards an objective which is nothing less than perfect communion in the very life of God for eternity.

This does not mean that man's life will be in two parts. Man must live his life-in-the-world as a son, not merely as the servant who does not share his Master's purpose, who does not work for himself, but as the son and the friend, who enters into his Father's plans, and whose work forms part of a whole from

[1] Ecclesiastical Assistant to Pax Romana. The address, delivered at the WSCF — Pax Romana Consultation, was translated from the French by Margaret House.

which he is not excluded. This communion in the divine will for earthly existence presupposes communion in the divine will concerning the actual mystery of the Deity. It is through the same theological love that man consents to what God is in himself, beyond all created things — hallowed be thy name — and that he consents and strives that the divine will shall be done on earth as it is in heaven.

The love which is charity, agape, guarantees the unity of man in the diversity of his tasks and of his twofold vocation [1].

Sin and redemptive grace

The rupture caused by sin, and which could have completely compromised the divine plan, has not in fact done so. The grace of redemption succeeds the grace of innocence. Man the sinner is still the man called to build the earthly city and the City of God. Through the grace of Christ he can respond to this call. Faith and baptism bring him into the fellowship of the Father, the Son, and the Holy Spirit, and allow him to work in the world as a son of God.

But interior unity is only given in embryo, in a nature which the rupture somehow upset and delivered up to anarchy.

[1] We find the same thought in a remarkable study by Professor Jean Ladrière on "History and Destiny" in the *Revue philosophique de Louvain*, February 1960. "The notion of destiny carries with it the suggestion of finality and at the same time of a call, and also this idea that man cannot accede to the truth of his own being except inasmuch as he allows himself to be carried away by this call. But this call may be, as it were, the very word of what is truly human in man, what makes him a man, or it may be a call from God revealing himself to man. We must, therefore, make a distinction between natural and supernatural destiny. In the first, the initiative is with reason, the foundation course of human nature. In the second, the initiative is with God, and in relation to the former it represents an overplus, a bonus which no natural disposition, no merit of his own, could procure for man ; in a word, it is a completely free gift.

"This definition, however, cannot be taken as signifying mere juxtaposition. From the moment when supernatural destiny enters in, it produces its effects not only within its own order, but also within the natural order ; without modifying what is essential to this order it exercises an influence which rectifies and activates its powers. Thus one may speak as Maritain does, of a secondary effect of grace which is a superelevation of nature within its own order. Thus we see charity quickening civic friendship, fortifying the spirit of peace and unity — or faith lending reason a reflection of its own light, in reason's activity of philosophy."

Even when reconciled, man must still struggle to subdue the totality of his being to the law of unitive love.

It is from day to day that "the inner man" (II Cor. 4 : 16) must be renewed. The dynamics of the supernatural life, if not thwarted, makes of the baptized new creatures who, "with unveiled face, beholding the glory of the Lord, are being changed into his likeness from one degree of glory to another ; for this comes from the Lord who is the Spirit" (II Cor. 3 : 18). At the climax of this transformation through which the Christian reflects more and more brightly the image of Christ, who is the perfect "image of the invisible God" (Col. 1 : 15), anarchy would be overcome, and the Christian made perfect as the Heavenly Father is perfect, partaking of that very unity of the three Divine Persons.

The cosmos

The world of nature, the physical universe, proceeded from God's creative power. "God saw everything that he had made, and behold, it was very good" (Gen. 1 : 31). Created for man, who himself was created for God, the universe is affected in some manner by the vicissitudes of man's spiritual adventure. But the universe is not affected by man's sin and by Christ's redemption in the same manner. The hope of glory, due to Christ's resurrection, is for the universe of the senses the promise of a new state, achieved in ways beyond our power to imagine, but certainly conferring on it a beauty and a splendour derived not from material sources but from the supernatural glory of the Spirit. "The subjection to futility" of which St. Paul speaks (Rom. 8 : 20) does not imply that the material creation has become bad in itself whereas it was once good. The curse which was put upon it after the fall — "Cursed is the ground because of you" (Gen. 3 : 17), said Yahweh to Adam — in no way justifies such a Manichistic interpretation. Whereas divine hope really makes the whole universe share in the expectation of the Parousia wherein its own laws will be found to have changed, perhaps somewhat like those of risen bodies, man's sin cannot make the cosmos intrinsically bad. What then is the meaning of the curse of Genesis ? Nothing more nor less than

this : it is enough that the heart of man should change, for its relation to the universe to be upset, and for the latter to become not only a place of exile, but also a vale of tears, and from some points of view a snare and a temptation. In the Christian experience of a life regarded as a period of exile and testing, there is nothing which in itself justifies contempt for the world, nothing to prevent one enjoying this marvellous world of nature. The primitive command that man should subdue the earth and dominate every other living thing has not been rescinded. Only the conditions of its performance have altered, and the brittleness of a will which can resist grace has made the effort of this will ambiguous when applied to the construction of the world, just as its successes are ambiguous, being usable for good or evil.

We shall show how there can co-exist in the Christian, without any contradiction, both a wonder-filled vision of nature, of this nature that he is also called to mark with his seal, to transform for the service and delight of mankind, and also his keen consciousness of the precariousness of things here below and the misery of the human condition.

Technology

On condition that we keep the preceding considerations in mind, we may embark upon the problem of technology itself.

It is part of the call received by man by virtue of his very nature. Every creature, indeed, whether spiritual or material, is subjected to the law of development. Man, who stands at the horizon of purely spiritual realities and of the cosmos, not by virtue of juxtaposing these two separate worlds within himself, but by making them meet in the substantial unity of his being, does not escape this law. To develop is to bring to their completion the inherent capacities of his nature. If he is ordered to subdue the earth, it is not only because the earth is intended to increase its fertility with the help of man's labour, but it is also and primarily because man will develop himself in this encounter which, on account of sin, has become a struggle.

Technological activity, like social life, is one of the consequences of man's condition as spirit incarnate. So we see it at

the dawn of history, as the first sign which helps us to recognize a kinsman. For, essentially, it is the introduction into material reality of a finality proper to man [1]. From this it derives an intrinsic value, which, like the work of art, is to be a witness to our dignity, a sign, written in stone or other material, of freedom and the spirit. It carries a surplus-value of being. And this surplus helps to form our actual state, by liberating it from physical and biological servitudes. Without technology, whether that whereby man succeeded for the first time in preserving the flame after a fire caused by lightning, or produced by rubbing two flints together, whether it was printing or the steam engine, we should not be what we are. Already automation is transforming life enormously, and the development of cybernetics and its applications will doubtless considerably modify the features of our society.

Technology itself is a good, and so therefore is the science which makes it possible and which in turn benefits from it. It is not moral goodness, which belongs to another order, that of freedom, but it is what philosophers and theologians call ontological goodness.

It would follow that the ontological goodness of which we are speaking, and whose corollary is the notion of integrity, would intrinsically imply a certain finality, this reference to the use which man is called to make of it. If we imagine, for example, a machine or some object which is remarkable for technical achievement, but the use of which could not be anything but immoral, whose very existence would tempt to sin, we could perhaps say that something essential is missing which would enable this object fully to express this notion of ontological goodness, as though it reflected the morality — or immorality — of its author. "Every instrument carries within itself", said Heisenberg, "the spirit in which it was created" [2]. In fact, this finality of the object is independent of its author's purposes for himself. The author gives the object its human or anti-human finality. He gives it its own special purpose. The technical

[1] Cf. *Valeur humaine de la technique,* in *Nova et Vetera* (Fribourg, 1950), No. 1, pp. 1-23.

[2] *Physique et Philosophie* (Paris, 1961), p. 10.

object is morally neutral. Only the use to which it is put is susceptible of a moral qualification.

But to recognize this intrinsic goodness of all true knowledge, of every discovery, of every valid technical achievement, is not without significance from the point of view of man and his freedom of action. The immoral use of visible creation, and this derived creation which is technical achievement, is certainly an offence against God in the first place — a refusal to take this place as a son of God in the world, to perform in it the work willed by the Father — but it is also to deflect a good thing from the purposes which gave it all its meaning when they inserted it in some way into what we might call the hymn of creation. The bad use to which technology may be put remains accidental to it and does not detract from the benefit which it represents as a liberating factor for man.

Again from the ontological point of view, we could underline a fortunate consequence of technology. It is one of the signs of men's solidarity. Whatever I do today, I am in debt to the research, the effort, and the work of unknown brothers.

From what has just been said, it might be concluded that sin has not tainted the cultural achievement of which technology is one aspect. The sinner himself — in the Catholic sense, the man who wittingly lives cut off from God and who wholly or in part refuses the grace of redemption (even if he preserves supernatural faith and hope) — the sinner himself can make something technically perfect, for example a hearing-aid for the deaf. This work is good and remains good. It helps to build the earthly city, to push back the limits of real servitude. Yet the author, even if he was not moved by evil motives in making it (it is not impossible that he should have had the explicit purpose of serving his brethren), did not for all that act as a son of God, in this close union with God which alone is the basis of charity. His work and the perfection of his accomplishment do not advance him one step nearer salvation, which transcends all human achievement. At most, by maintaining a certain natural generosity within him, they remove some supplementary obstacle (instead of working he might be an opium addict !) and somewhat diminish the difficulties of a Christian standard of behaviour when the grace of conversion has been accepted.

II

The end and the means

We were saying that although sin has not spoiled what was ontologically good, nor nullified the command given to man to subdue the earth and cultivate the garden of creation, man redeemed by grace remains a morally frail creature. Christ's victory in him does not protect him right away from the temptations of evil. Without prejudging the heart's secrets, it seems possible to say without risk of error that on the whole man tends to use the gifts of nature and the gifts of grace badly rather than well. It is undoubtedly the same with the gifts of technology. Such a consideration only applies, it is true, to one aspect. It is when we compare man in his dignity as a person and in relation to his essential vocation with the actual behaviour which he chooses most of the time that sadness grips the heart.

Perhaps the wisdom of the Far East has turned away from technical activity and the things of this world partly because of this bitter experience. Whatever the metaphysical presuppositions which support it, moreover, we know that it is more guided in its deeper choices by a grasp which it owes to experience of the slavery of the spirit imprisoned by the cosmic illusion, than by the rational principles which serve to explain its views and discursively justify its alarms.

The attitude of the East cannot fail to awaken a responsive echo in the Christian. For after all, the eye of faith increases the dignity of man to infinity; the affirmation of absolute transcendence of a personal God brings out marvellously the grandeur of man made in his image, of man as person. From this follows that other characteristic which sets man apart from all visible creatures: to act as a man, to act freely, to be responsible, is to answer for oneself and one's acts before God. The majesty of the Questioner reflects upon the one called to account and in some way reveals him to himself. Finally, man is loved, saved, and redeemed by the death of the only Son of God, and destined by pure grace to enter into the threefold life.

We may then ask the following question : if it is true that man is in danger of abusing goods, of becoming a slave to them instead of using them to conquer a higher liberty, is it not better to teach him to do without things rather than to make things which will enslave him tomorrow ?

That, we know, is the solution chosen by oriental wisdom. A Christian who has heard the word of the gospel, "What will it profit a man, if he gains the whole world and forfeits his life ?" (Matt. 16 : 26), will not find the language of the Philosophers of the Celestial Way foreign to him. He knows that, apart from the metaphysical context, they touch a truth that the Christian faith is not going to blunt, but raise to quite supernatural power. He knows that every man will experience once in his lifetime the moment when he is called really to leave practically everything, and to leave himself, to enter the Kingdom and share in perfect freedom. This hour of truth, every Christian knows, is not only decisive, but may strike from one minute to the next.

It is really an hour of truth, for the whole person is at stake, and illusions and evasions are equally impossible. The riches of art and technology are left a long way behind, at the far end of the shore that he is about to leave. Psychological techniques themselves have become equally ridiculous. Man is as helpless as the day he was born, with no other resource outside himself than the infinite mercy, and none within himself but the burning flame of charity, the gift of God, which it was his vocation to preserve and increase. The achievement of culture could not be authentically human if by some means or other it did not take this into account ; if the liberation which it is considered to give did not help this interior disposability which will not tolerate compromise.

Yet Christian wisdom, which we see is even more exacting than oriental wisdom, has taken a very different attitude to the problem of methods in general and of technical achievement in particular. It does not deny the prime importance of contemplation. On the contrary, it affirms it with incomparable force, but it differs most sharply from oriental thought, and it is there that it finds its own solutions to this problem of the end and the means.

Christian contemplation

Christian contemplation emanates from the love of charity, which plays the role of beginning and end, and which is also the means of attaining the highest wisdom. When, in the soul emptied of itself, the Spirit which has diffused the divine agape in our hearts takes the initiative of love into its hands, the soul, says spiritual tradition, is moved more than it moves, and love, whose essential function is to realize union, unites God and the soul in such a way that the latter in some way gains experience of the hidden mystery of its God. It knows him in a new way, not by a discursive knowledge, however elevated, but through this non-conceptual knowledge which springs out of love itself. St. Thomas Aquinas, who knew these two wisdoms, did not hesitate to describe theology as straw, by comparison with this superior knowledge of the gifts of the Holy Spirit. This gives real meaning to the words of the apostle : "He who is united to the Lord becomes one spirit with him" (I Cor. 6 : 17).

Because contemplation is the operation of the love of charity, it will not be in opposition to action but will stimulate it. Charity in relation to God implies this fusion which St. Augustine described thus : "*Idem velle, idem nolle.*" First it is assent to what God is in himself beyond all created things, joy that God should be God. One of the most beautiful and lofty expressions of love I find in this quotation from a French spiritual writer of the seventeenth century : "My God, I thank you for what you are in yourself, as much as for the greatest grace that I have and ever can have." But love wants what God wants ; not only that "thy name be hallowed" — but also that "thy kingdom come", that "thy will be done, on earth as it is in heaven". And this fusion of the will of men and the will of God implies that man in his place and in his own vocation works for the coming of the Kingdom and the accomplishment of the divine will. Action proceeds from the contemplative love.

From the primacy of contemplation follows, in a Christian perspective, not the condemnation, but the benediction of every human effort which seeks to perfect man in accordance with his natural and supernatural capacities. Charity has in itself enough resources to bring all things back to God in Christ.

"All are yours", said the apostle, "and you are Christ's, and Christ is God's" (I Cor. 3 : 22-23), and, in the same epistle to the Corinthians : "Whether you eat or drink, or whatever you do, do all to the glory of God" (I Cor. 10 : 31).

The answer to the paradox

We can now try, in the light of revelation, to answer our question, whether we should not do better to teach man to do without rather than to use created goods, if the risk of abuse is so great.

The gospel does not contradict Genesis. The sayings, "What will it profit a man, if he gain the whole world and forfeits his life ?", and "Leave the dead to bury their dead", are not in antithesis to the primitive command to man to subdue the earth, and to develop himself according to his full nature.

The answer to the paradox seems to us to be found in the Catholic doctrine of "evangelical counsels" and in their right application. I borrow from a Carthusian monk a formulation of this doctrine which seems particularly felicitous in its brevity :

> The theologian will first say that the *counsel* of poverty, the invitation to free oneself from things, especially from things that it is natural for man to want and to possess in moderation, can only be followed in response to the call of grace, which affects souls in different ways and each one in its own time. We all need to withdraw and to attend to interior witness, but this light which detaches us radically and finally liberates us from the tangible must be given us by God as a gift, for which our generosity and our patience must prepare us, a lengthy process for some, in a life whose engagements and servitudes may be part of our spiritual destiny. For lack of these distinctions, this preparation and this filial docility, ascesis and meditation can also mislead souls ; they offer precisely the danger... of a technique !
>
> The second remark of the Christian moralist is the following : to free ourselves of possessions is wisdom for all of us, when God calls us to do so, but to free others, or even to invite them to free themselves, is no virtue whatever. Poverty and obedience help the spiritual progress of individuals ; abundance and liberty are good things which we should guarantee to every civil society as far as we are able. An ascetic may well renounce human remedies, if he receives from God this virtue ; but the Russian peasants who as late

> as the nineteenth century let small-pox carry off their children or strike them with blindness because vaccination was a diabolical way of escaping the will of God, and because blindness was a help rather than a hindrance to salvation, seem to us to be very far removed from the spirit of the Christian west ; though their simplicity may be touching, we should be guilty if we were to imitate them [1].

What then is the theological significance of this position in relation to our problem ?

I see it on two planes :

1. *On the individual plane*

Catholicism recognizes that the effective practice of the evangelical counsels — which corresponds here to the minimum use of human means or wealth — is one of the ways that certain baptized Christians are called to take, by a special vocation from our Lord. They even call this way "the way of perfection", in opposition to "the common way". That does not mean that those who set out upon it are more perfect than those who follow another way, common to the majority of Christians, towards the same perfection, but that the Christian takes this way as being more likely to lead to the perfection of love : "If you would be perfect, go, sell what you possess... and come, follow me" (Matt. 19 : 21). We shall see that every Christian must be ready to accomplish, when faithfulness to Christ requires it, acts of the greatest renunciation. But to some Christ *counsels* that they should choose them even when there is no compulsion.

However many Christians are called to follow this way, it will never be more than a tiny minority. God will ask them, it is true, to serve chiefly the Kingdom and to renounce a human vocation. If they are technicians, artists, or scientists, that is accidental. Their role among humanity is to remind us of the Kingdom's absolutes. By what might appear to be a withdrawal from the world's stage, these Christians, so long as they are faithful to their vocation, render distinguished service to the world and culture in addition. What art and pure and disinterested learning bring to culture, but from the very heart of

[1] *Valeur humaine de la technique*, in *Nova et Vetera, op. cit.*, pp. 12-13.

culture, by their very "uselessness" and gratuitousness, all this is brought eminently and as though from a transcendent source by life lived according to the evangelical counsels. A civilization which had no place for this life would stifle the breath of art and pure knowledge within itself, and would soon lose all title to the name of civilization.

But the doctrine of the evangelical counsels applies not only to those of whom we have just been speaking. Every baptized Christian may be called to live this same renunciation in a similar spirit, that is, through love of Christ, if the circumstances of his life, which in themselves express a divine will and thus a vocation, compel him. How many have accepted the deprivations of poverty and chastity as a way of being true to their faith, or simply to a divine precept, who would have thought it presumptuous to choose them ?

Yet these Christians retain a specifically human vocation : they are scientists, technicians, artists. The call to enter into the Kingdom does not for them entail renunciation of these tasks of building the terrestrial city. On the contrary, as has been said, they are invited to work in it with all the greater earnestness and generosity because, through their faith, they understand the dignity hidden in each of their human brothers, believing or unbelieving.

They have grace to live fully the spirit of the gospel — this constant readiness to be of service of which we spoke earlier — if they are faithful, without any diminution of their passionate interest in their human labour. This is the grace which belongs to their state, the special hold which theological charity has on their life. In this way they will follow St. Paul's advice : "The appointed time has grown very short ; from now on... let those who deal with the world (live) as though they had no dealings with it" (I Cor. 7 : 29-31), that is, without being enslaved to it, with the freedom which allows you to take everything without being possessed by anything except by God.

2. *On the social plane*

The evangelical counsels, the maxims of the Sermon on the Mount, envisage access to the Kingdom of God and the demands of life in harmony with this Kingdom. Now it is individual

people and not states or societies which are called to enter this Kingdom. To apply to temporal society as such the counsels of the gospel is not only a mistake but is ultimately to imperil the spiritual life of the majority of this society ; the consequence is often to fall short of the demands of love and justice. To try to make these maxims into principles of social justice, is to build a society dominated by injustice. It would amount, for example, to condemning the right to strike, or of lawful defence. It would be to confuse trust in Providence with culpable improvidence, the source of want and famine for the poorest members of the community (the rich will always find a way out !). God's plan for the city is not that.

The counsel of detachment may be followed by individuals, and should be, where it applies to their own spirit, but society as such is subject to other laws. All the work of the technician and the scientist, as of all who serve the temporal community, contributes towards another objective, which although it is not explicitly defined in the New Testament, is no less in accord with what revelation teaches us about God's designs for man and his double vocation. If it is truly lived by Christians, the evangelical spirit will reflect upon the life of the city. You would misunderstand me if you were to interpret my thought as being that the gospel has no word for the temporal order. In fact, the temporal order cannot do without the evangelical leaven of the gospel.

On the personal plane, the Evangelist's message retains its full force : "If your right eye causes you to sin, pluck it out and throw it away : it is better that you lose one of your members than that your whole body be thrown into hell" (Matt. 5 : 29). On that level, better to lose everything than seriously to imperil the precious pearl of charity.

On the plane of society, our answer to our question should be no : the Christian must face the real risks which technology causes him to run. On that plane, it seems possible to say : every risk must be taken except that of mutilating man. The renunciation of real progress in man's mastery of the world would be that risk.

The Scientific Revolution

Michael Polanyi [1]

The illness which has prevented me from attending your meeting has also given me a chance to reconsider once more the theme which you have asked me to speak about. During my stay in hospital there fell into my hands — by the kindness of its author — a book which has revealed to me a new, and I think much better, understanding of the situation we are facing today in consequence of the modern scientific revolution. The author is Josef Pieper, Professor of Philosophical Anthropology at the University of Munster, and his book which so impressed me is entitled *Scholastik* [2]. Owing to this book, I can see now that the conflict between faith and reason evoked by natural science today is but a modern variant of a problem which has filled the thoughts of men in other forms ever since the dawn of philosophic speculation 2,500 years ago.

You will notice that by dating the beginning of philosophy in the sixth century B.C. I am localizing this event in Greece and more particularly in Ionia and the Greek isles. I know this may be challenged and shall not argue it. Suffice it to say that, in my view, our anxiety about the relation between faith and reason here in Europe today is the legacy of a particular intellectual family. Modern science has been recently spreading this disturbance all over the planet, but it has formed no part of the heritage of Chinese or Hindu thought. It has originated with, and has remained for two and a half millennia the preoccupation of, that part of humanity that has culturally centred mainly on Europe.

Greek, medieval, and modern rationalism

But even accepting these limits, the simplification I now see appearing before me may seem excessively sweeping. I see

[1] The author, who is Professor of Philosophy at Merton College, Oxford, was prevented by illness from delivering this address to the WSCF World Teaching Conference held in Strasbourg, July 1960.

[2] Published in English by Phaedon Books, New York.

extending behind us three consecutive periods of rationalism, the Greek, the medieval, and the modern. Greek rationalism rose from a bed of mythopoetic thought. We may define this for brevity as a predominantly personal interpretation of all things. Myths and ritual couch most thoughts of men in terms of I-Thou and leave nothing of importance to be spoken of in terms of I-It. Greek speculative thought tended to liberate the mind from this personal network, by establishing a broad area of objective thought. It extended I-It relations into a new philosophic interpretation of things. In this Greek rationalism, reason was used for eroding and replacing traditional beliefs, unquestioningly held or tacitly taken for granted.

The Christian message exploded into this scene as an outrage to rationalism. It restored the relation of I to Thou to the centre of everything. It proclaimed that a man put to death a few years before in a remote provincial capital was the Son of the Almighty God ruling the universe, and had atoned by his death for the sins of mankind. The Christian's duty was to believe in this event and be totally absorbed by its implications. Faith, faith that mocks reason, faith that scornfully declares itself to be mere foolishness in the face of Greek rationalism, is what St. Paul enjoins on his audiences.

The picture is familiar. But you may ask me where I see any trace here of a new Christian, medieval rationalism, striving to reconcile faith with reason. It emerged later as this message spread among an intelligentsia steeped in Greek philosophy. It was to be formulated by St. Augustine in terms that became statutory for a thousand years after. Reason was declared ancillary to faith, supporting it up to the point where revelation took over, after which in its turn faith opened up new paths to reason. What Professor Pieper has shown to me for the first time is that the entire movement of scholastic philosophy from Boethius to William of Ockham was but a variation on this theme.

Ockham brought scholasticism to a close by declaring that faith and reason were incompatible and should be kept strictly separate. Thus he ushered in the period of modern rationalism, established on this division, with the proviso that reason alone can establish true knowledge. Henceforth, as John Locke was

soon to put it, faith was no longer accepted as a higher power that reveals knowledge lying beyond the range of observation and reason, but as a mere personal acceptance which falls short of rational demonstrability. The mutual position of the two Augustinian levels was inverted.

In a way this step would have brought us back to Greek rationalism, and many of its authors did so regard it. They hoped that the new secular world view would appease religious strife and bring back the blessings of an antique dispassionate religious indifference. However, post-Christian rationalism soon entered on paths never trodden before by man, and we stand here today at the dismal end of this journey.

Towards a restoration of the lost harmony between faith and science

But I have not come here to denounce modern rationalism. The arts, the intellectual splendours, and moral attainments of the past three hundred years stand unrivalled in the history of mankind. The very failures and disasters that surround us may themselves bear testimony to this greatness. Only gigantic endeavour could precipitate us into such absurdities as the modern scientific outlook has made current today, and could set millions ablaze with a new bitterly sceptical fanaticism.

I shall take today these manifold and profoundly serious shortcomings of our present situation for granted, and shall bend all my effort to tracing a new line of thought along which, I believe, we may recover some of the ground rashly abandoned by the march of the modern scientific outlook. I believe indeed that this line of thought, if pursued systematically, may eventually restore the balance between belief and reason on lines essentially similar to those marked out by St. Augustine at the dawn of Christian rationalism.

I shall try to show you what I have in mind by speaking of the human person, and then expanding this, so far as time permits, into an analysis of discovery. Modern science and scientific philosophy cannot analyse the human person without reducing it to a machine. This flows from assuming that all mental processes are to be explained in terms of neurology, which in their turn must be represented as a chart of physical and chemical processes. The damage wrought by the modern

scientific outlook is actually even more extensive: it tends towards replacing everywhere the personal I-Thou by an impersonal I-It.

Any attempt to restore a more sane and truthful view of the human person must go to the very roots of the conception of knowledge, and I shall start off in this direction by giving you an example to illustrate some of the essential features of knowledge which are disregarded by the modern conception of positive scientific knowledge.

The two forms of knowledge

A few years ago a distinguished psychiatrist demonstrated to his students a patient who was having a mild fit of some kind. Later the class discussed the question whether this had been an epileptic or an hystero-epileptic seizure. The matter was finally decided by the psychiatrist: "Gentlemen", he said, "you have seen true epileptic seizure. I cannot tell you how to recognize it; you will learn this by more extensive experience."

This psychiatrist knew how to recognize this disease, but he was not at all certain how he did this. In other words, he recognized the disease by attending to its comprehensive appearance, and did so by relying on a multitude of clues which he could not clearly specify. Thus his knowledge of the disease differed altogether from his knowledge of these clues or symptoms. He recognized the disease by attending to it, while he was not attending to the symptoms in themselves, but only as clues. We may say that he was knowing the clues only by relying on them for attending to the pathological physiognomy to which they contributed. So if he could not tell what these clues were, while he could tell what the disease was, this was due to the fact that while we can always identify a thing we are attending to, and indeed our very attending identifies it, we cannot always identify the particulars on which we rely in our attending on the thing.

This fact can be generalized widely. There are vast domains of knowledge — of which I shall speak in a moment — that exemplify in various manners that we are in general unable to tell what particulars we are aware of when attending to a whole which they constitute. So we can declare that there are two

kinds of knowing which invariably enter jointly into any act of knowing a comprehensive entity. There is 1) a knowing by attending to something, as we attend to the entity in question, and 2) a knowing by relying on our awareness of certain things in the way we rely on our awareness of the many particulars of the entity in the act of attending to it.

We can go further. Evidently, any attempt to identify the particulars of an entity would involve a shift of attention from the entity to the particulars. We would have to relax the attention given to the whole for the sake of discovering its particulars, which we had noticed until now only by being aware of them as parts of the whole. So that once we have succeeded in fully identifying these particulars, and are in fact attending to them now directly in themselves, we clearly shall not be relying any more on our awareness of them as particulars of a whole, and therefore will inevitably have lost sight of the whole altogether.

This fact is abundantly borne out by half a century of Gestalt psychology. We may put it as follows. It is not possible to be aware of a particular in terms of its contribution to a whole and at the same time to focus our attention on it in itself. Or again, since it is not possible to be aware of anything at the same time subsidiarily and focally, we necessarily tend to lose sight of an entity by attending focally to its particulars.

But we may add that this loss need not be definitive. We may successfully analyse the symptoms of a disease and concentrate our attention on its several particulars, and then return to our conception of its general appearance, by becoming once more subsidiarily aware of these particulars as constituent parts of the comprehensive picture of the disease. Indeed, such an oscillation of detailing and integrating is the royal road for deepening our understanding of any comprehensive entity.

Knowing and comprehending

In saying this, I have pronounced a key word. I have spoken of understanding. Understanding — comprehension : this is the cognitive faculty cast aside by a positivistic theory of knowledge, which refuses to acknowledge the existence of comprehensive entities as distinct from their particulars, and this is the faculty

which I recognize as the central act of knowing. For comprehension can never be absent from any process of knowing, as it is indeed the ultimate sanction of any such act. What is not understood cannot be said to be known.

Lest this analysis appear too abstract, let me rapidly run through various forms of knowing to which it strikingly applies. I have so far used as my leading example the process of medical diagnostics. We have a closely similar process in the identification of the species to which an animal or a plant belongs. An expert who can identify 800,000 species of insects must rely on a vast number of clues which he cannot identify in themselves. This is why zoology and botany cannot be learned from printed pages, any more than medicine can. This is why so many hours of practical teaching in the laboratory has to be given also in many other branches of the natural sciences. Wherever this happens, there some knowledge of the comprehensive aspect of things is being transmitted, a knowledge of those things which we must acquire by becoming aware of a multitude of clues that cannot be exhaustively identified.

We must learn to identify the physiognomy of such things by relying on clues which cannot be clearly identified in themselves. But we hardly ever do such diagnosing without examining the object in question, and this testing itself has to be learned together with the physiognomies of the tested objects. We must jointly learn to be skilful testers as well as expert knowers. Actually, these are only two different and inseparable processes of comprehension. Expert knowing relies on a comprehension of clues, as skilful examination relies on a combination of tricks for tracing these clues.

Skills and tools

This reveals the structure of skills quite generally. A performance is called skilful precisely because we cannot clearly identify its component muscular acts. The craftsman's cunning consists in controlling these component acts jointly with a view to a comprehensive achievement. Such also is the sportsman's and musical performer's mastery. Neither can tell much, and mostly can tell very little, about the several muscular tricks he combines in accomplishing his art.

Skills usually require tools — instruments of some kind, and these are things patently akin to the particulars of a comprehensive entity. For they are tools or instruments by virtue of the very fact that we rely on them for accomplishing something to which we are attending by using the tool or instrument. In this case we can admittedly identify that on which we rely, though mostly we do not quite know how we actually use it. In any case, it still remains strikingly true that we cannot direct our attention to the thing on which we rely as our tool while relying on it for a skilful performance. You must keep your eye on the ball, and if you look at your racket instead, you inevitably lose the stroke. Any skilful performance is paralyzed by attending focally to its tools.

The same is true of speech. Listen to the sound of your words, while forgetting their context and meaning, which is the comprehensive entity which it is their function to subserve, and you will be instantly struck dumb. This brings in the whole multitude of signs, symbols, and gestures by which human communications are achieved and by the practical use of which the intelligence of man is developed far beyond that of the animals. Here is another vital area of skilful doing and knowing, all over which we are met with comprehensive entities to which we attend, and can attend only, by relying subsidiarily on things and acts of our own, to which we do not attend, and must not attend in themselves, for the time being.

Perception

We may add lastly that, deep down, in the most primitive forms of knowing, in the act of sensory perception, we meet with the very paradigm of the structure which I have postulated for all kinds of knowledge at all levels. It was indeed sensory perception, and particularly the way we see things, that has supplied Gestalt psychologists with material for their fundamental discoveries which I am expanding here into a new theory of knowledge. They have shown that our seeing is an act of comprehension for which we rely in a most subtle manner on clues from all over the field of vision, as well as on clues inside our body, supplied by the muscles controlling the motion of the eyes and the posture of the body. All these clues become effective

only if we keep concentrating our attention on the objects we are perceiving. Many of the clues cannot be known in themselves at all, others can be traced only by acute scientific analysis, but all of them can serve the purpose of seeing what is in front of us only if we make no attempt at looking at them or attend to them in any way in themselves. They must be left to abide in the role of unspecifiable particulars of the spectacle perceived by our eyes, if we are to see anything at all.

This concludes my list. We have now before us the art of diagnostics and of the testing of objects to be diagnosed, as taught in universities ; we have the practice of skills in general and the skilful use of tools in particular, which leads on to the use of words and other signs by which human intelligence is developed ; and finally we have the act of perception, the most fundamental manifestation of intelligence, both in animals and men. In each of these cases we have recognized the typical elements of comprehension. I now want to show how this panorama of knowing suggests a new conception of knowledge, equally comprising both the I-It and the I-Thou, and establishing at the same time a new harmony between belief and reason.

Knowledge and learning

Clearly, the new element I have introduced here into the conception of knowing is the knowing of things by relying on our awareness of them for attending to something else that comprehends them. Now, we have an obvious experience of certain things which we know almost exclusively by relying on them. Our body is a collection of such things ; we hardly ever observe our own body as we observe an external object, but continuously rely on it as a tool for observing objects outside and for manipulating these for our own purposes. Hence we may identify the knowing of something by attending to something else, as the kind of knowledge we have of our own body by living in it. This kind of knowing is not an I-It relation, but rather a way of existing, a manner of being. We might call it an I-Myself or I-Me relation.

We are, of course, born to live in our body and to feel that we are relying on it for our existence, but the more skilful uses

of our body have to be acquired by a process of learning. For example, the faculty of seeing things by using our eyes is not inborn; it has to be acquired by a process of learning.

We may say then that when we get to know something as a clue, as a particular of a whole, as a tool, as a word, or as an element contributing to perception, by learning to rely on it, we do so in the same way as we learn to rely on our body for exercising intellectual and practical control over objects of our surroundings. So any extension of the area of reliance by which we enrich our subsidiary knowledge of things is an extension of the kind of knowledge we usually have of our body; it is indeed an extension of our bodily existence to include things outside it. To acquire new subsidiary knowledge is to enlarge and modify our intellectual being by assimilating the things we learn to rely on. Alternatively, we may describe the process as an act of pouring ourselves into these things.

These ways of acquiring knowledge may sound strange, but then we are dealing with a kind of knowledge which, though familiar enough to us all, seems never to have been identified by students of the theory of knowledge. Evidently, all hitherto recognized processes for acquiring knowledge, whether based on experience or deduction, only apply to knowledge of things we are attending to, and not at all to what we know of things by relying on our awareness of them in the process of attending to something else. I shall continue, therefore, undeterred, my account of the way such knowledge is acquired and held, however curious this account may sound at first hearing.

Knowledge by indwelling

When we rely on our awareness of some things for attending to something else, we may be said to have assimilated these things to our body. In other words, subsidiary knowledge is held by indwelling. Thus we comprehend the particulars of a whole in terms of the whole by dwelling in the particulars. We grasp the joint meaning of the particulars by dwelling in them.

My examples of comprehension will illustrate these conclusions. To diagnose a disease is to grasp the joint meaning of its symptoms, many of which we could not specify. These particulars we know subsidiarily by dwelling in them. Indwelling has

a more obvious meaning when applied to a skilful testing of an object or any other feat of expert handling. Here we literally dwell in the innumerable muscular acts which contribute to our purpose, and this purpose is their joint meaning. Indwelling is most vivid in man's use of language. Human intelligence lives only by grasping the meaning and mastering the use of language. Little indeed of our mind lives in our natural body ; our person comes into existence when our lips shape words and our eyes read print. The intellectual difference between a naked pigmy of Central Africa and a member of the French Academy is grounded in the cultural equipment by which Paris surpasses the African jungle. The French Academician's superior personality is formed and manifested by his intelligent use of this superior equipment.

Foreknowing the unknown

This brings us to the very threshold of our understanding of the way we know a human person. But let us consider first for a moment the way comprehension is achieved, as envisaged in the extended sense given to it by my examples. More often than not we comprehend things in a flash. But it is more instructive to think of the way we struggle from a puzzled incomprehension of a state of affairs towards its real meaning. The success of such efforts demonstrates man's capacity for knowing the presence of a hidden reality accessible to his understanding. The active foreknowledge of an unknown reality is the true motive and guide of discovery in every field of mental endeavour. The explicit forms of reasoning, whether deductive or inductive, are impotent in themselves ; they can operate only as intellectual tools of the creative power residing in man's capacity to anticipate a hidden meaning of things.

This confidence in the hidden coherence of a puzzling state of affairs is guided by an external aid when a student is taught how to identify a disease or any other biological specimen. When the psychiatrist in the example I mentioned said to his students that they will learn to recognize in practice the characteristic appearance of an epileptic seizure, he meant that they would learn to do so by accepting his own diagnosis of such cases and trying to understand what he based it on. All practical

teaching, teaching of comprehension in all the senses of the term, is based on authority. The student must be confident that his master understands what he is trying to teach him and that he, the student, will eventually succeed in his turn in understanding the meaning of the things which are being explained to him.

Plato has argued that the task of solving a problem is logically absurd and therefore impossible. For if we already know the solution, there is no occasion to search for it, while if we don't know it, we can do nothing to find it, for we don't know then what we are looking for. The task of solving a problem is indeed self-contradictory, unless we admit that we can possess true intimations of the unknown. This is what Plato's argument proves, namely, that every advance in understanding is moved and guided by our fundamental power of seeing the presence of some hidden comprehensive entity behind the as yet incomprehensible clues which we see pointing towards this yet unknown entity. Our confidence in these powers of our own may arise from the depth of our own enquiring mind, or it may be guided by our confidence in the judgment of our masters. Yet it is always the same dynamic power, and its dynamics are akin to the dynamics of faith. Tillich says that "that which is meant by an act of faith cannot be approached in any other way than through an act of faith". And the same holds here. There is no other way of approaching a hidden meaning than by entrusting ourselves to our intimations of its yet unseen presence. These intimations are the only path towards enlarging our intellectual mastery over our surroundings.

A dynamic conception of knowledge

Tillich says that his dynamic conception of faith "is the result of conceptual analysis, both of the objective and subjective side of faith". This is precisely what I claim for my derivation of the dynamic conception of knowing. It is derived in the last resort from our realization of the two kinds of knowledge which combine to the understanding of a comprehensive entity when we rely on our awareness of particulars for our knowledge of the entity to which we are attending. Our awareness of the particulars is the personal, our knowledge of the entity the objective, element of knowing.

The dynamic force by which we acquire understanding is only reduced and never lost when we hold knowledge acquired by its impulse. It sustains the conviction for dwelling in this knowledge and for developing our thoughts within its framework. Live knowledge is a perpetual source of new surmises, an inexhaustible mine of still hidden implications. The death of Max von Laue a short while ago should remind us that his discovery of the diffraction of X-rays by crystals was universally acclaimed as an amazing confirmation of Boyle's speculation on the structure of crystals, which itself was a development of ideas originating with Lucretius and Epicurus. And Dalton's theory was amazingly confirmed in its turn by the experiments of J. J. Thompson eighty years later. To hold knowledge is indeed always a commitment to indeterminate implications, for human knowledge is but an intimation of reality, and we can never quite tell what reality will do next. It is external to us, it is objective, and, by the same token, its future manifestations can never be completely under our intellectual control.

So all true knowledge is inherently hazardous, just as all true faith is a leap into the unknown. Knowing includes its own uncertainty as an integral part of it, just as, according to Tillich, all faith necessarily includes its own dubiety.

The traditional division between faith and reason, or faith and science (which Tillich reaffirms), reflects the assumption that reason and science proceed by explicit rules of logical deduction or inductive generalization. But I have said that these operations are impotent by themselves, and I could add that they cannot even be strictly defined by themselves. To know is to understand, and explicit logical processes are effective only as tools of a dynamic commitment by which we expand our understanding and then hold on to it. Once this is recognized, the contrast between faith and reason dissolves, and a close similarity of structure emerges in its place.

Admittedly, religious conversion commits our whole person and changes our whole being in a way that an expansion of natural knowledge does not do. But once the dynamics of knowing are recognized as the dominant principle of knowledge, the difference appears only as one of degree. For — as we have seen — all extension of comprehension involves an expansion of

ourselves into a new dwelling place, of which we assimilate the framework by relying on it as we do on our own body. Indeed, the whole intellectual being of man comes into existence in this very manner, by absorbing the language and the cultural heritage in which he is brought up. The amazing deployment of the infant mind is stirred on by a veritable blaze of confidence sensing the hidden meanings of speech and other adult behaviour and grasping this meaning. Moreover, the structure of the child's dynamic intellectual progress has its counterpart on the highest levels of creative achievement, and both these structures resemble closely that of the self-transformation entailed in a religious conversion.

From objective observation to personal knowledge

But a deeper division between reason and faith may be found in the urge towards objectivity which tends to break up the I-Thou axis of the religious world-view and establish everywhere I-It relations in its place. Has not the modern positivist outlook exercised its pressure even on the purely secular studies of the human mind, as well as of human affairs whether past or present, in favour of a mechanical conception of man which represents him as a bundle of appetites, or as a mechanical toy, or as a passive product of social circumstances ?

It has, but this is due in my opinion to the obsessive limitation of knowledge to the outcome of explicit inferences. Persons can be identified only as comprehensive entities by relying on our awareness of numberless particulars, most of which we could never specify in themselves. This is the same process by which we diagnose an elusive illness or read a printed page. Just as we assimilate the symptoms of a disease by attending focally to the disease itself, and as we assimilate the printed text by attending to its meaning, so we assimilate the workings of another man's mind by attending to his mind. In this sense we may be said to know his mind by dwelling in its manifestations. Such is the structure of empathy (that I would prefer to call conviviality) which alone can establish a knowledge of other minds and indeed of any living being whatever.

Behaviourism tries to replace convivial knowledge by I-It observations of the particulars by which the mind of an

individual manifests itself and tries to relate these particulars to each other by a process of explicit inference. But since most of the particulars in question cannot be observed in themselves at all and, in any case, their relation cannot be explicitly stated, the enterprise ends up by replacing its original subject by a grotesque simulacrum of it in which the mind itself is missing. The kind of knowledge which I am vindicating here, and which I call personal knowledge, casts aside these absurdities of the current scientific approach and reconciles the process of knowing with the act of addressing another person. In doing so it establishes a continuous ascent from our less personal knowing of inanimate matter to our convivial knowing of living beings, and beyond this to the knowing of our responsible fellow men. Such, I believe, is the true transition from the sciences to the humanities and also from our knowing the laws of nature to our knowing the person of God.

Scientific and Christian conceptions of man

But is the kind of person we may know in this manner not floating vaguely above its own bodily substance, outside of which it actually cannot exist at all ? The answer to this question will reveal a surprising affinity between my conception of personhood and a central doctrine of Christianity.

I have said that the mind of a person is a comprehensive entity which is not specifiable in terms of its constituent particulars ; but this is not to say that it can exist apart or outside of these particulars. The meaning of a printed page cannot be specified in terms of a chemical analysis of its ink and paper, but neither can this meaning be conveyed without the use of ink and paper. Though the laws of physics and chemistry apply to the particles of the body, they do not determine the manifestations of the mind ; their function is to offer an opportunity for the mind to live and manifest itself. Our sense organs, our brain, the whole infinitely complex interplay of our organism offer to the mind the instruments for exercising its intelligence and judgment, and, at the same time, they restrict the scope of this enterprise, deflecting it by delusions, obstructing it by sickness, and terminating it by death.

The knowing of comprehensive entities establishes a series of ascending levels of existence, and the relationship I have just outlined obtains throughout between succeeding levels of this hierarchy. The existence of a higher principle is always rooted in the inferior levels governed by less comprehensive principles. Within this lower medium and by virtue of it, the higher principle operates freely, but not unconditionally, its range being restricted and its every action tainted by the lower principles on which it has to rely for exercising its own powers.

As the rising levels of existence were created by successive stages of evolution, each new level achieved higher powers entramelled by new possibilities of corruption. Our inanimate beginning was deathless, subject neither to failure nor suffering. From this have emerged levels of biotic existence subject to malformation and disease, and then, at higher stages, to illusion, to error, to neurotic affliction — finally to produce in man, in addition to all these liabilities, an ingrained propensity to do evil. Such is the necessary condition of a morally responsible being, grafted on a bestiality through which alone it can exercise its own powers.

Such is the inescapable predicament of man which theology has called his fallen nature. Our vision of redemption is the converse of this predicament. It is the vision of a man set free from this bondage. Such a man would be God incarnate ; he would suffer and die as a man and by this very act prove himself divinely free from evil. This is the event, whether historic or mythical, which shattered the framework of Greek rationalism and has set for all times the hopes and obligations of man far beyond the horizon of here and now.

Natural and supernatural knowledge

I have mentioned divinity and the possibility of knowing God. These subjects lie outside my argument. But my conception of knowing opens the way to them. Knowing, as a dynamic force of comprehension, uncovers at each step a new hidden meaning. It reveals a universe of comprehensive entities which represent the meaning of their largely unspecifiable particulars. A universe constructed as an ascending hierarchy of meaning

and excellence is very different from the picture of a chance collocation of atoms to which the examination of the universe by explicit modes of inference leads us. The vision of such a hierarchy inevitably sweeps on to envisage the meaning of the universe as a whole. Natural knowing expands continuously into supernatural knowing.

The very act of scientific discovery offers a paradigm of this transition. It is a passionate pursuit of a hidden meaning, guided by an intensely personal foreknowledge of this hidden reality. The intrinsic hazards of such efforts are of its essence ; discovery is defined as an advancement of knowledge that cannot be achieved by any application of explicit modes of inference, however diligent. Yet the discoverer must labour night and day. For though no labour can make a discovery, no discovery can be made without intense, absorbing, devoted labour. Here we have, in paradigm, the Pauline scheme of faith, works, and grace. The discoverer works in the belief that his labours will prepare his mind for receiving a truth from sources over which he has no control. I regard the Pauline scheme, therefore, as the only adequate conception of scientific discovery.

* * *

Such is, in bold outline, my program for reconsidering the conception of knowledge and restoring thereby the harmony between faith and reason. Few of the clues which are guiding me today were available to the scholastics. The modes of reasoning which they relied on were inadequate ; their knowledge of nature was poor and often spurious. Moreover, the faith they wanted to prove to be rational was cast into excessively rigid and detailed formulae, presenting intractable and sometimes even absurd problems to the reasoning mind.

Even so, though their enterprise collapsed, it left great monuments behind it. I believe that we are today in an infinitely better position to renew their basic endeavour. The present need for it could not be more pressing. We should therefore spare no effort for advancing this enterprise.

Witness in the Age of Modern Science and Technology

Heinrich C. Rohrbach [1]

In what I am going to say I shall deal first with the situation of students and professors in universities, and also of graduates; secondly, with the religious training and education which the Student Christian Movements attempt to give students, and thirdly, the witness of Christian students and graduates in our scientific and technological society, especially as this witness is expressed in action for those who no longer believe.

Harmful effects of the technological approach to life

As has been said many times in this meeting, universities and society in general are deeply influenced by the scientific and technological way of thinking. What impresses me, especially in Germany, is that the success and apparent reliability and effectiveness of technology and science influence the way in which students look at life in general. Already in the elementary school they have the feeling that those things on which they can build their life, with reasonable assurance that they will hold true, are scientific. All other approaches to reality — historic, philosophical, aesthetic — have become "relative". The students say, "I know science doesn't explain everything, but at least I want to limit myself to that which I can know for sure, to that which is reliable, even though I have the feeling that this may not be the full life."

This means, among other things, that the way in which students look at their time in the university is deeply influenced by this technological approach to life : they see it as a period of preparation for a professional career, as a useful, purposeful,

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effective period of their life, and less and less as something which has meaning in itself, a period of growth, of searching, of becoming a mature adult.

The dangers of this approach to life need not be enlarged upon here, but I want to cite just one consequence among many : the influence of this technological and pseudo-scientific attitude to life upon the relationship between men and women students. The other person is seen in the light of popularized psychology, as an object, rather than as a unique person meeting me. I objectify myself, they say, I realize my complexes, my needs, and my desires, and I realize that here is a person with corresponding desires and complexes.

Good effects

I want also to point out a few good results of this approach. For one thing — and again this may be especially meaningful in Germany — students on the whole are relatively sceptical about ideologies. They are critical of, and in general opposed to, any system of values imposed without proof. However, this obviously creates a great vacuum, as far as the meaning of life is concerned, and this vacuum is dangerous, because men are not able to live with it. There is also a search for friendship. Fifty per cent of all male students at German universities are members of fraternities. We of the Protestant Student Christian Movement very much opposed the rise of these fraternities, because we feared the reactionary spirit which they represented in the past. However, we now realize that this is only partly true, and that students are honestly seeking nothing more than a small group of friends. They do have an ideology, theoretically, expressed in the famous old words, *Ehre, Gott, und Vaterland,* but it doesn't mean much for the students.

The key word is disinterest

I want now to say something about the attitude of these students towards the Christian faith, the Church, and the Student Christian Movement. The key word here is disinterest. I was struck by the similarity of our situation to that revealed by a survey carried out by the Lutheran Churches in the United

States. A questionnaire given to all Lutheran student pastors concerning the attitude towards the Church of more or less non-practising Christian students disclosed that they were disinterested, even to some extent suspicious of the Church and its ministers, and any interest they did have was purely intellectual. The same could be said about German students, and this in a country where all but two per cent of the adult population has received 600 to 1,100 hours of religious instruction, to a great extent in schools.

This is because ninety per cent of the people live without any meaningful, visible contact with the Church. There are many reasons for this, into which I cannot go here, but I want to pick out one point which seems to be especially relevant to students. It seems to me that these young men and women, who enter the university at the age of nineteen, have been taught that the Christian faith is true for every honest, sincere person. They have come to know God as a subject of objective inquiry : Mathematics, Monday from 8.00-9.00 ; History from 9.00-10.00 ; Religion from 10.00-11.00, and Geography from 11.00-12.00 — one subject among others. Later on they discover that this Christian faith, whether true or not, apparently doesn't mean very much to the majority of people. And these people are not dishonest, they are not bad : they are just ordinary people. And, moreover, the Church is apparently unable to prove to them the relevance which this Christian faith is supposed to have for life. And therefore they say, "All right, if they can live without it, so can I."

These non-Christians (and I do not mean this in the strict theological sense, for I know that they are baptized), these non-practising people, do not ridicule the Christian faith ; they do not oppose the Student Christian Movement, or attack those students who are its loyal members. They simply say, "All right. You go on believing. That's all right with me. You're interested in religion and the supernatural ; I'm not." They will readily admit that they, as scientists, for instance, do not have the answers to all the questions. They do not claim that there is any conflict between science and religion — that has become very rare indeed. They simply say either, "I don't think it makes any sense to spend your life searching for its meaning",

or, "If I were to search for the meaning of life I certainly would not try to find it in the Christian faith, which I have learned about in hundreds of hours of religious instruction. They have not been able to convince me that it is very meaningful."

I will give you an example. A professor of theoretical mathematics gave an evening lecture in a university auditorium crowded with 500 students on the relationship between the Christian faith and natural sciences. It was an excellent lecture — he has given hundreds of them on this subject — and the students applauded him. Then they almost immediately asked, "Now will you please tell us how you, as a mathematician, as a Christian, believe in God ?" You see, he had spoken in general terms about theology and natural sciences. And then he gave his testimony in, to use German Protestant vocabulary, pietistic terms. He spoke of God, who had redeemed him from his sins by the Saviour, Jesus Christ, so that he wouldn't go to hell, but to heaven. And the result was that the students said, "We don't get it. This has no meaning, no relationship to what he said before." They noted the schism, the separation between the two worlds, in this one man.

The starting-point of witness

I want now to discuss religious training, education, growth in faith, or however you want to translate *formation religieuse*, in this situation. The Student Christian Movement, the Church, and Christians in general must recognize the legitimacy of the challenge contained in this indifference, in this criticism of the Church. However, the situation itself cannot be the starting-point. It would be very dangerous to let the Christian witness become the slave of the moods and fashions of the day. Rather, the starting-point of witness can only be found in the insights into its faith gained by the Church through theology. In a sense, you can say that this understanding, this renewal, has also been influenced by the sciences. The controversy with the natural sciences and historical research has forced and enabled the Church to see more clearly the nature of its own knowledge of God. Among the professors in the theological faculties there has been an amazing number of new insights, and new visions

of the faith. But these insights are not passed on. As a report from Canada has said, "There seems to be a conspiracy of silence as far as the findings of theology are concerned with regard to the parishes."

I believe that this phenomenon can be rather easily explained. It seems to me that for centuries the Church has increasingly resisted growth. It has resisted belief in the living God, and confined him to a certain period of history. It has not taken up the challenge of history, of the historical and natural sciences, and therefore its faithful members have tended to become more and more "other worldly", complacent, self-sufficient, unable to communicate the gospel or to make it relevant. Therefore, ministers — at least those in the Protestant churches where the new insights have caused revolutions — trained in this period very frequently do not dare to teach and preach what they have learned. There is in the Church an unwritten dogma about respect for the weak, found in Paul's epistles to the Corinthians, and, as sarcastic people in Germany sometimes say, respect for the weak has deteriorated into a dictatorship of the weak. I see this when I visit my friends who are parish ministers. The books from which they received their theological insights tend more and more to fill the upper shelves of their bookcases, and those which can be easily reached are filled with literature which was relevant fifty years ago, when historians thought in a "spiritual" way.

Bringing students up to date theologically

In this situation our task of Christian education and training is very simply one of bringing students up to date theologically. I know this sounds rather technical : perhaps I have been affected by the technological age ! For me this is at the heart of spiritual life. While this task is to be approached positively, if at all possible, it will also mean at times the dissolution of wrong preconceptions held by the students. I tell students this dissolution is necessary because we are not in the world for our own sake, but to preach the gospel, and therefore we must say goodbye to preconceptions which prevent us from bringing the good news to our fellow students. This implies the unfolding

of the history of God's dealings with this world, not as some sacred history apart from this world, but as the acts of the living God in the history of mankind.

I have experienced time and again how the whole Bible becomes alive for students when they understand its dramatic, historic character. For instance, as a record of events in prehistoric times, the stories of the creation, the fall, the flood, and the tower of Babel are incomprehensible, offensive, irrelevant, and even if they are believed, they don't really mean anything. When these stories are seen as a condensation and expression of the experience of the people of Israel with God, in whom they believed in a very concrete, historic age, they become relevant and helpful, and contain a message for our own historical situation. The same holds true for the New Testament. When students realize that the gospels as well as the epistles are the witness of the Church in different places, situations, cultures, and among different religions, they become meaningful. What had been a stumbling block, because they were seeking for an unhistoric, objective, stenographic record, becomes meaningful, because Mark, John, and Matthew are suddenly seen as people in a situation which is essentially the same as our own. One needs only to know the weight of a non-historic, static, non-dynamic understanding of the faith, in order to understand the liberation which students feel when they realize that even the most highly respected and difficult formulations of the New Testament can and must be understood in their historical context, not because secular historians force us to understand them so, but because, as John says, God became man, and not a formulation, a doctrine, or a theology.

Of course, this does not mean men were utterly off the track when they battled in synods about the doctrine of the two natures : nothing of the kind. What we must have is not an unhistoric criticism, but an understanding that our situation today is the same as that of the Church throughout the ages : we are charged with the task of formulating the faith in our own age, running, as a living Church always does, the risk of heresy, but with the promise that the living God will guide us.

All this may explain why we in the German *Studentengemeinde* do not carry on a special program of training for students

of the sciences. The problems which science poses for the Christian fall into their proper perspective when they are seen in the context of history. On the other hand, physics, chemistry, biology, psychology, medicine, etc. raise questions for all of us, for we all live in the scientific age. The aim of theological training should be to bring men to realize that in our age a Christian should be, can be, one who believes in God through Jesus, his Lord, and who is driven by the same God to ask most profoundly who this God is for us today ; that a Church which believes this is driven by the same living God to formulate anew just what it believes about him, who is its Lord ; that the same Jesus, who is its Lord, drives it to ask most profoundly how he can become the Lord of secular, non-religious men and women. Those who know the writings of Dietrich Bonhoeffer will realize that I am only quoting his formulation.

The witness of Christian students

The witness of Christian students and graduates consists of the attempt to answer the questions which the Lord himself puts to the Church. First, those who come with theological questions to student Christian groups or associations of Christian graduates, should receive honest answers, including the admission of the cowardice of so many representatives of the Church. They have a right to free and courageous answers from Christians, not in apologetic terms which are used for those outside, but in the terms in which Christians themselves believe in God. Secondly, student Christian groups and graduates have a responsibility to enquire actively into those questions which are relevant for students, not to raise those questions in which Christians are interested, but to ask the "non-Christians" what they are concerned about. I shall give just one example. The student Christian groups in technical colleges are on the whole very small — maybe fifteen out of a thousand — partly as a result of the schedule of these poor students (they have thirty-eight to forty hours of classes per week and, in addition, all their homework). I tell them, "You have a vicarious responsibility for your fellow students. Take the initiative and, if possible, ask the director of the school to include in the schedule at least two or three times a semester a free period for consideration,

by lecture and discussion, of any one question which is relevant for the non-technological human existence of the students, now and later in their professions." And then I tell them, "And now be careful. Don't sit together, the fifteen of you, around one table, and think what might interest those horrible people who don't come to your meetings in spite of your inviting them all the time. Go to the fraternities, ask the student representatives of the student union, ask the professors, Christians and non-Christians, those who are concerned about questions beyond their own mathematical round. Let them sit together around the table, and then say, 'There's nothing on the table. We are going to discuss anything. Not the newest methods of digging holes, but anything that is of relevance for your responsibility towards your friends, society, yourselves, or however you want to formulate it.' And then you will discover the questions which students have." One way in which students can formulate the question about the meaning of life is simply by asking, "Who is man ?" or, in a more personal way, "Who am I ?" Christians are challenged to witness to their faith in terms of this question without, on the one hand, putting a false stumbling block in the way of the enquirers, and, on the other, without denying the cross.

My experience in Germany has been that it is much easier to carry on conversations like this with non-Christians than with Christians. The trouble with the Christians is largely that they imagine that they are exempt from the currents which are moving society, that they are in a little corner, unrelated to history, trying to safeguard salvation through their lives, and in general with the feeling that what concerns these heathen fortunately doesn't touch them. And that is why it is so difficult to speak with them, because, in my opinion, a living faith can only exist where people are disturbed, moved to the depths of their hearts. And it is relatively easy so to move non-Christians, if one finds the right approach.

The necessity of "engagement"

There is always the danger of intellectualism, of managing to avoid the "engagement" of one's own life, even if one does understand the Christian faith historically, in the dynamic

sense of the word. Actually, the "engagement" is, strictly speaking, not a secondary addition to the historic understanding of God's work with this world, but rather its result. It may mean that a group of graduates visits their pastor and encourages him to teach and preach in such a way that his people will grow and mature in their confession of God and not remain separated from their fellow men, unable to speak to them about God, or in the name of God. This has led in many cases to circles of people who prepare the sermons with their pastors. In one student parish in Germany the minister says in his sermon, "I am no longer alone responsible for this. When I speak here, I do so in the name of a group, of a team." It may mean that some student groups take the initiative to go to Israel to work in a kibbutz alongside the Jews, as a testimony largely without words. This has nothing to do with science, apparently, but it has much to do with an attitude which says that the Christian faith is irrelevant.

Other students have become active in the various attempts to reform our university structure, which is full of antiquated conceptions. On the whole, these are readily acknowledged, but they are scarcely being changed. Two students who were convicted of blasphemy, and one conscientious objector whose stand was unjustly questioned by the court, were defended by student parishes.

* * *

In conclusion, I should say that the hardest part of witnessing to the Christian faith, for the Church, as well as for the Student Christian Movement, may be this : not to gain anything directly for its own organization — success, honour, or importance — but to disregard to some extent its own security for the sake of service to the world, remembering that Christ was the Christ because he did not want to be anything for himself ; and also remembering that the end and aim of God's action in history is directed towards his whole world, of which the Church is only an imperfect beginning.

THE STUDENT WORLD CHRONICLE

The Christian Mission in College and University

A STATEMENT BY THE SCM OF GREAT BRITAIN AND IRELAND

The General Council of the Student Christian Movement, recognizing as its primary concern the Christian mission in college and university, adopted the following statement at its meeting in September, 1960. It commended the statement to the branches of the Movement for study and appropriate action.

Preface

The students who first came together at the end of the last century to found what is now the Student Christian Movement understood their task primarily in terms of presenting in colleges and universities the challenge of the foreign mission field. Soon, however, they came to see that a more immediate task was the proclamation of the gospel to their fellow students. In setting themselves to this task they did not consider they were inventing any new gospel or displacing the Church. The task remained part of the Church's task : the gospel was the "faith once delivered to the saints". The SCM was seen as a new instrument which God could use, if he thought good, to spread his gospel and to build his Church.

The SCM believes that over the years God has given it a growing understanding of the Church's mission. It has seen that this must include much more than the verbal proclamation of the gospel, for the Christian mission is the unfolding in history of the work of Christ for the world, and therefore involves the whole of the Church's life and the whole life of mankind. The varied activities of the SCM have sought to reflect this growing understanding.

In its concern for the Christian mission in colleges and universities the SCM has not been alone. God has used other instruments also, though they may have understood the task differently. In recent years the churches themselves have begun to show a direct concern in the student field : chaplaincies and denominational societies are evidence of this. But the multiplication of Christian agencies in many colleges and universities, together with the great expansion in their student population, has created a new situation

which requires all of us to think afresh about the life and mission of the Church among students.

This document attempts to state briefly some convictions of the SCM about the Christian mission in colleges and universities, for the sake of its own members and others who are involved. Underlying these convictions are two special concerns : (i) for mission to those who are remote from the life of the churches, and (ii) for an ecumenical understanding of the missionary task and an ecumenical approach to it. To both of these concerns the rapid expansion of the student population gives a special urgency.

Where mission begins

The object of the Christian mission is to restore all men in Christ as sons of God, so that they may offer the worship and obedience due to him. For this purpose the Holy Spirit is continually given, and his work in renewing men and calling them into a common life of faith and love in the Church is God's primary witness to himself. Therefore, in colleges and universities as elsewhere, the Christian mission is bound up with the life of the Church and our life in the Church.

This necessarily implies for us *membership of a particular denomination,* and faithful use of the means of grace and riches of Christian tradition which are available to us within it. In the fellowship of our denomination and through its ministry of Word and Sacrament we are renewed in the life of the Spirit and given strength for the missionary task that falls to each one of us.

However, if our lives are to be lived fully within the Church of God, we must also share in that *ecumenical fellowship* to which God is calling our churches, and claim our part in the tradition and experience of the Church in every age and place. The SCM, as an interdenominational and international movement, attempts to express this greater fellowship within the life of college and university. In it Christian students have learned to regard each other with mutual love and forgiveness, and to understand and accept one another, even when their deepest convictions about the gospel, the Church, and the world have differed. Such fellowship is in itself a witness to the gospel, and its discipline strengthens and purifies the Christian life of those who belong to it. This too is vital : for the quality of the individual Christian's life is as relevant to the missionary task as is the quality of the life of the Christian community.

Our part in the Christian mission therefore challenges us to *holy living.* The idea of holiness is often misunderstood as meaning that Christians ought in some way to be sealed off from the world ; but

God so loved the world that he gave his Son to die for it. It is by his Spirit working in us that we are made holy. This is not the place to attempt to work out what holy living means — in terms of spiritual discipline, and in terms of our attitude to our work, our personal relationships, our responsibilities as citizens, and so on — but certainly it implies an active love and compassion for the world, and because of Christ's lordship a concern for every aspect of its life.

What mission means

To be called into the community of the Church is to be sent into the world. The command to go and make disciples of all nations is laid on every member of Christ's Church, including those who are still inexperienced in the faith. Just as the mission of the first disciples was to begin from Jerusalem, so we also are called to start where we are in the colleges and universities in which we study. Students will listen most readily to the good news from those who stand alongside them and share with them the discipline of the academic life.

Mission means witness. Jesus Christ sent his disciples into the world to be his witnesses. We in our turn are called to bear witness in our lives and by our words to all that God has done and still does in Christ, and this in terms that our contemporaries will understand. This is not easy, for many of them will consider what we do and say meaningless, irrelevant, or impertinent. The effectiveness of our witness, however, does not depend on our own strength or cleverness, but on the initiative and power of God.

Mission means service. As we are sent to bear witness in the world, so we are sent to serve the world. This will mean not only individual acts of service for those who are with us in college, or for those at a distance whom we are able to help, e.g. through international relief organizations or service schemes. It will also mean playing a responsible part in student government and societies, and in the whole life of college and university. To take part in such activities is itself a witness to Christ, for it is evidence of his concern for the world.

As students *our witness and service will call for seriousness in study.* This applies first of all to our academic studies, not only because in using our minds to the best of our ability we glorify God, but also because it is in and through the subjects we study that we are called primarily to witness to God and to serve him and our fellow-men. It applies also to the study of the Word of God and of the world to which that Word is spoken, even where these lie outside the field of

our academic work. We must seek to understand God's Word as it is witnessed to in Holy Scriptures and affirmed by the Church in its worship and its creeds, using our critical judgment and intelligence, but remembering that God's Word is spoken to us that we may obey it. We must at the same time seek to understand the world. There is no area of the world's life into which Christ has not preceded us. We should therefore use every opportunity to learn about it in all its complexity, so that we can enter imaginatively into the condition of men, to discern Christ's presence and to disclose him to them.

Though the mission of the disciples began from Jerusalem, it was to lead them to Judea and Samaria and to the end of the earth. We must therefore not consider our mission as lying only within the academic community. The original purpose of the SCM was to enlist students in the work of extending the Kingdom of God throughout the whole world. This concern is as important to us as ever. We must see ourselves involved in the whole life and mission of the Church. While this may sometimes mean bearing witness and giving service outside the academic community while we are still students, for most of us this wider task will begin after we leave college, and our present task is to prepare ourselves for it. As part of our preparation, we must be ready to hear what God is saying to us as we decide what our future work should be and where we should do it. Some of us will see our work in the full-time service of the Church, in Britain or beyond, but whatever we do must be regarded in the light of the Christian mission, and as having its own peculiar opportunities for witness and service.

What mission involves

Within the total mission of the Church there can be no rigid division of task between separate churches or between different geographical areas. Jesus prayed "that they all may be one ... that the world may believe that thou hast sent me". The aim of all mission is to bring men into fellowship with God and with one another. This is almost entirely contradicted in principle and vitiated in practice by the existence of different and separate denominations.

The ecumenical movement in its modern form was born from the need to consider missionary strategy in global terms, but it was soon realized that if our Lord's prayer was to be fulfilled, the extension, unity, and renewal of the Church must be sought at one and the same time. It was found necessary to look beyond inter-church co-operation towards the reunion of the Church. It was further seen that in speaking of the renewal of the Church we must also speak of the renewal of the structures and communities of the world, for Jesus

Christ is the Lord and Saviour of the world as well as of the Church, and in him *all* things are being made new. Thus the word "ecumenical" (which is derived from the Greek word *oikoumene*, meaning "the inhabited earth") is not to be used merely in the sense of inter-church relations, but it must also be used to describe the active concern of the churches for the whole life of mankind.

It is worth remembering that this ecumenical movement has been possible only because there existed in the SCM and other similar organizations a fellowship of Christians from different backgrounds and traditions who knew and trusted each other and were used to working together. The ultimate reunion of the Church itself will require a growing number of people with the same experience.

It seems to the SCM, therefore, that three things are implied if the life and mission of the Church in colleges and universities is to be truly ecumenical.

1. Our Christian fellowship must be *interdenominational.* We cannot ignore the reality of divisions or the traditions and experience of our different churches, but we must seek to express for the sake of the gospel the unity we are given in Christ. The critical approach of students makes them particularly conscious of the weakness revealed by acquiescence in disunity. Moreover, Christian students need for their own spiritual growth the experience of a fellowship which is both interdenominational and comprehends different theological positions.

2. Our fellowship must be *international.* We live at a time when God is forging his world into a unity, and our lives must correspond with this conviction. This means we must welcome into our fellowship students from overseas who are studying in our country and be prepared to learn from them. We must also be alive to the problems of other countries and to our responsibilities with regard to them. In this connection the SCM attaches great value to membership of the World Student Christian Federation, through which it is able to share in the mission of students throughout the world.

3. Our fellowship must be *concerned with the life of the world.* To use words taken from the SCM's statement of Aim, we must "work for the understanding and acceptance in the thought and life of college and university of the lordship of Christ over the whole life of mankind". To do this we must seek to understand contemporary society in all its complexity, and be ready to wrestle both in study and in practice with the real problems and hopes of the world.

Finally, if our Christian fellowship is to be truly missionary as well as being truly ecumenical, it must be *open.* Christians are called out

of the world into the fellowship of the Church. Yet clearly they are still related to the world, both by being in it, immersed in its life and affairs, and by being sent to it with the gospel. The fellowship of the Church should not, therefore, cut us off from the world, but enable us to live fully within it. The purpose of open fellowship is that Christians should maintain real conversation and human fellowship with those who cannot honestly commit themselves to Christ. Such openness is necessary if we are to speak to the world and serve it in the mission to which we are called.

Visit to Yugoslavia [1]

ELISABETH ADLER

My last Federation journey took me to Yugoslavia. I was, I believe, not only the first person to go there on behalf of the World Student Christian Federation, but also the first visitor to the Yugoslav churches from the DDR. At least, when I told the friendly woman in the DDR Consulate in Belgrade that I had come as a guest of the Reformed Church of Yugoslavia, she said, "Nobody from the DDR has visited this organization before." I had received an invitation from the Reformed Church as a result of our first contacts with Yugoslav students, members of this church, at the WSCF conferences in Strasbourg and Salonica last summer.

The Reformed Church, with 40,000 members, is the second largest Protestant Church in Yugoslavia, but, together with the Lutheran Church (or rather three Lutheran Churches), and the Methodist and Baptist Churches (about 5,000 members), constitutes only one per cent of the population.

Nearly all its members are of Hungarian descent : they read the Bible in Hungarian, sing Hungarian hymns, and, with a few exceptions, hold their services in Hungarian. Their common origin binds the members of a congregation very closely together, especially in rural areas. But the danger inherent in identifying language, nationality, and church affiliation must not be ignored. The Reformed Church is not the only one in Yugoslavia where ethnic origin and

[1] This brief article was published in *Federation News*, July 1961. As we have not had in *The Student World* in recent years any travel diary on Yugoslavia, we are reprinting it here. Elisabeth Adler is WSCF Associate General Secretary.

church affiliation coincide : the largest church in the land, the Orthodox, is the church of the Serbs ; the second biggest, the Roman Catholic, is made up principally of Slovenes and Croats, although there are also a number of Slovak and Hungarian Catholics. The 50,000 Lutherans are divided into three churches according to nationality. About ten per cent of the population are Muslims ; these live in Montenegro and Herzegovina, where the Turks have left most trace. After the last war, all fifteen national minorities were given equal rights (they are allowed to have schools and newspapers in their own languages, for example), but the old rivalry and much chauvinism are still to be found. I was told that, during the German occupation, the Croats who collaborated with the Germans treated Serbia even more cruelly than the occupying forces, and this has not been forgotten. A Hungarian pastor, with whom I travelled by car, kept pointing out how neat and clean were the Hungarian and Slovak villages in comparison with the Serbian. By the end of the eighteenth century the settlement of the regions east of the Danube, Banat, and Backa, had given rise to closed national and confessional communities, and the former German villages are today without churches : they were destroyed in reprisal for the many atrocities committed by the Germans in Yugoslavia — the disastrous result of the identification of nationality with church !

Today there is scarcely any ecumenical co-operation. The Ecumenical Council of Protestant Churches in Yugoslavia exists on paper but has never met. It seems to me that barriers of language and nationality are far greater than that of confession. Aid from abroad, badly needed by the smaller Protestant churches for the salary of pastors and the upkeep of church buildings, only helps to keep the churches apart, for it is obviously easier for an outside body to send support to brethren of its own confession.

In Yugoslavia I came to realize how many non-theological factors hinder collaboration between the churches — and this is not only true of Yugoslavia ! The following little story illustrates how unimportant confessional differences are in comparison with other factors. At the end of the last century some Hungarian Catholics settled in a Roman Catholic Croat village. The newcomers asked that Hungarian be used in the mass also, but the Roman Catholic Croat bishop informed them that he would rather hear a dog barking in his church than a single word of Hungarian ! So the Hungarian Catholics looked around for some place where they could hear the gospel in their own tongue, and discovered in the neighbourhood a Hungarian Reformed pastor, whose preaching they found quite acceptable. Ever since, they and their descendants have been of the Reformed faith.

In such a situation the supply of new ministers presents a real problem. Formerly the Reformed went to do their theological studies in Cluj (Klausenburg) in Rumania, and the Lutherans usually to Germany. The latter still send their theological students abroad (at present there are two in Vienna), while the Reformed have tried to establish their own little Institute, though they do not have enough teachers or students. The Orthodox Church maintains two seminaries, and also a theological academy in Belgrade, which I visited. Until 1952 this academy was the theological faculty of the university ; now it is independent. The number of theological students has decreased by about half, and the reasons for this are not clear. It may be because the church's resources do not stretch to wider undertakings, but it may also be because fewer young people nowadays have the inclination and courage to become priests. Pastors of all confessions told me that the youth of Yugoslavia are showing less and less interest in the church. The newspaper reported that in an opinion poll among Zagreb students, seventy-one per cent of those questioned declared religion to be unnecessary and harmful. (As to Marxist doctrine, sixty-three per cent favoured it, sixteen per cent thought it too dogmatic and out of date, and twenty-one per cent said they were not interested in theories as such.)

Young people usually lose contact with the church when they leave home. The church is, of course, part of their home town, their background, of the old tradition, so they leave it behind them when they go to the city to study, for instance. The younger generation believes in science and technology, and perhaps even in the standard of living.

To the foreigner, Yugoslavia seems one of the cheapest countries in the world, but for its inhabitants prices are too high, for salaries are quite low. The average monthly wage of a worker is about 15,000 dinars, or not quite 150 Swiss francs, and in Yugoslavia this is less than the price of a suit. Students get grants of 8,000 to 10,000 dinars, but one student assured me that they need 12,000. Most students have no money left by the twentieth of the month. Grants are not made by the government, but by individual firms which thus bind the students to work for them for several years.

At the moment there are five universities in Yugoslavia : in Belgrade, Sarajevo, Skopje, Zagreb, and Ljubliana. But there are also many related institutions in neighbouring towns, and it seems that the original faculties which were established there will become the foundations of new universities. Technical high schools are treated as faculties of the universities. The number of students is increasing — there are now about 20,000 in Belgrade, 15,000 in Zagreb. In

Belgrade I met many foreign students: Africans, Japanese, Arabs. They receive a grant of 25,000 dinars a month and enjoy many privileges. "Everyone likes them", a student told me, "and they have quite a reputation with the girls!"

I was very pleased to meet five African students from Ghana, Nigeria, and Togo in the small student group of the Reformed Church in Belgrade. They asked more questions about the SCMs in their home countries than I could answer. For their sakes, I gave a Bible study in English, which was then translated into Hungarian for the benefit of the "native" students. The Africans usually talk to their Yugoslav friends in Serbian, which is the teaching language in the university, but which remains a foreign tongue for many of the Reformed students who went to Hungarian schools. This student group meets once a week for Bible study and has a social gathering in the parish house after the Sunday services. Some Orthodox and even a few Roman Catholic students have joined the group. Eight students live in a kind of student hostel in the basement of the parish house.

On my visit to the Orthodox theological faculty, I was accompanied by a Reformed student of psychology. Amazement on both sides: the Orthodox theological students had never thought it possible for non-theologians to meet together as Christian students, while the student of psychology was amazed that these Orthodox students seemed "quite normal" — their conversation too! (He had never met an Orthodox theological student in his own town!) After my report, the Orthodox theologians showed a critical interest in the work of the Federation. They asked about its principles and aims and about Orthodox participation in its leadership and activities.

To my great joy, I was also able to track down, in Zagreb, a student group which had been formed within the Lutheran congregation there. It is international and ecumenical, embracing Lutherans and Reformed, Slovene, Croat, and Hungarian students. Obviously the isolation felt by Christian students necessitates ecumenical — and, I should like to add, missionary — activity, but can one really speak of mission when there are only fifteen to twenty Christians in a university of 15,000 students?

In the students of Yugoslavia lies, I believe, the hope for the fusion of the different nationalities and for building up the nation's industry, thus freeing it from poverty. And in these little groups of Christian students lies the hope of the churches. If they remain true to their Lord, they can lead their churches out of the narrowness and traditionalism in which, by and large, they still live today.

BOOK REVIEWS

TECHNOLOGY AND THE CHRISTIAN, by C. A. Coulson. The Epworth Press, London. 112 pp. 8s. 3d. Published in the USA by Abingdon Press, New York.

CHRISTIANITY AND THE SCIENTIST, by Ian G. Barbour. Association Press, New York. 128 pp. $2.50.

Those who want to keep their libraries reasonably up to date on matters of science and faith must count on their rapid expansion these days. These two books have in common that they do not presuppose a deep insight into these matters; on the other hand, they differ rather much, both in their purpose and approach. Both authors are scientists: Professor Coulson is Professor of Mathematics at Oxford University, and Dr. Ian Barbour is a physicist. Why are the scientists of today so much more productive in writing about science and faith than the theologians?

Coulson starts by making a very distinct difference between the first and second industrial revolutions. He shows that we do not have to deal only with an acceleration of the first industrial revolution but that we must count on many entirely new factors creating new issues, for both the individual and society. The key to this change is the "merger" of science and technology. This puts a partly new moral responsibility on the scientist, and presents new aspects in the relation of Christian faith, science and technology. Coulson then gives three particular examples of matters which Christians are called to deal with more adequately: the provision of energy for the under-developed parts of the world, the question of food and over-population, and the influence of a higher standard of living on family life. Finally, he shows how today technology is almost the only area of work and thought where the various cultural and political blocs can meet, and how it exercises a unifying influence, although it is obviously inadequate to create unity by itself.

Coulson puts several severe questions to Christians and the Christian churches. Some of them are old and well known, and some are new. He asks why Christian churches almost always represent a conservative and reactionary attitude towards the development which science and technology bring about when the Christian message in itself ought to enable us to receive this as a gift of God and to treat it accordingly. And why are our churches so slow to recognize

the tremendous impact of science and technology not only on those who are professionally dealing with such matters but also indirectly on every person in modern society ? This must cause us to re-think the policy of Christian organizations and churches. Why, in the training of ministers, for example, do we give so much place to classical languages and Greek philosophy while often not even one hour is devoted to the study of what modern scientific thought is and how technology influences the pattern of thinking of ordinary men ? If we take the creation and incarnation seriously, then we must certainly be prepared for some radical changes not only in the training of ministers but also in the pattern of preaching, and what is perhaps even more important, we must be prepared to re-think not only our Christian ethic of work but also of leisure.

Barbour's book is written more directly for students of science. Of special interest are the chapters concerning scientific research, the pursuit of truth, and the responsibilities of a science teacher in relation to students and faculty. One might wish that, when dealing with science and the social order, Barbour had given more attention to the question of science in a Marxist setting.

The two books have in common a very simple and clear language, but they represent two different approaches to the topic as such. Barbour is trying to show that scientific work and personal Christian faith are very well reconcilable ; Coulson does not speak about science and technology on the one side and Christian faith on the other, but rather starts from the presupposition that wherever truth is pursued order and justice reign and God is at work.

The two books are complementary, and it is to be hoped that they will both be widely read and discussed in university circles, and that especially church boards and Christian organizations will consider seriously the three areas for Christian responsibility mentioned above. As Coulson points out, we must, as Christians, recognize what is happening in the new industrial revolution, we must show that the problems raised are not merely technological ones, but are compounded of science, technology, politics, and faith. It is for the Christian to set the pattern of thought against which decisions and actions may be judged. "The Christian really is the leaven in the lump. Only those who know the inner nature of men and the peculiar ways in which God transforms a man's mind by the renewing power of his spirit and the status which God confers upon him that he may be called a child of God, are big enough to speak to the condition of today."

Tore Littmarck.

LAND OF ELDORADO, by S. U. Barbieri. Friendship Press, New York. 161 pp. $2.95.

THE NOISE OF SOLEMN ASSEMBLIES, by Peter L. Berger. Doubleday & Co., New York. $1.75. 189 pp.

It is hardly still fashionable in European, and unthinkable one imagines in African or Asian, circles, to conceive of the Americas as the New World. That idea went out decades ago. And yet here one tired, degenerate, end-of-an-era European finds himself confronted with two books treating of the two halves of the continent which both self-confidently begin by proclaiming the futurity of their region. Both, interestingly enough, are written for intra-American consumption.

Bishop Barbieri, one of the Presidents of the World Council of Churches, has put together, with the help of a number of correspondents throughout the region, a quick but rambling sketch of his adopted continent, its history, its problems, and the life of its churches. He is clearly writing for the leaders and supporters of North American foreign missions, and many of his comments on possible future developments in the churches are in terms of the aid they can expect to receive from those sources, though "as a trust, not primarily as a gift".

Successive chapters outline the history of the continent and the history of Protestantism within it, which leads to an evaluation of contemporary problems and promise. The analysis passes from the continent as a whole to the Protestant churches with great fluidity and to the surprise of the one who learns what a small percentage of the population they still represent. In several places it is clear that hostility to the prevailing Roman church has left its mark, and even if other passages disavow further hostility, the reader sorely misses a sympathetic appreciation of the strengths and efforts of this powerful body, let alone a much less question-begging discussion of the various humanist and secular strivings.

Peter Berger's presentation of the futurity of North America in his opening chapter is quite different; not a future in which "only through much toil, daring and courage will Latin America become the 'Land of Eldorado' ", but rather the future that has already begun, the future towards which the rest of us are aspiring already made visible, and not only the European rest of us but every land and people who are harnessing their energies to the spiralling treadmill of "development", "economic advancement", "industrialization", or "technological progress". At which prospect, if it be confirmed in the next half-century, as it seems so likely to be, one can but utter the

usual mixture of "Heaven help us" and "Thank God". "Heaven help us" if the devastating picture drawn of congregational life comes to be true of our churches too ; "Thank God" for the quality of mind exemplified in the manner of its devastation.

The title comes from Amos 5, one of those forthright prophetic condemnations, splendid in a verve and a precision which also characterize this Essay on Religious Establishment in America. Even the ground-plan promises well : a preface on perception, balanced finally by a postcript on commitment ; between them two solid chapters on the nature of the religious establishment and the task of disestablishment, separated by "an interlude — some conciliatory comments". The quality of the writing is equally neat, and effective. At one point in his description of "political religion", the author has occasion to quote from *The Decline and Fall of the Roman Empire* :

> The various modes of worship which prevailed in the Roman world were all considered by the people as equally true ; by the philosopher as equally false ; and by the magistrate as equally useful. And thus toleration produced not only mutual indulgence, but even religious concord.

Dr. Berger's own stylistic gifts of trenchancy and exactitude are by no means unworthy to put alongside Gibbon's ; compare for instance this passage :

> The very nature of Christian faith precludes the complete absence of tension with a culture. This, of course, does not mean that Christians will always be persecuted in a violent way. There are many ways of being eaten by lions. But a situation in which the Christians are indistinguishable from all the other spectators in the cultural coliseum is hardly one in which we would find much faithfulness to the example of the crucified Savior.

Both in its style and its content the book is a tribute to the "relentless intellectual honesty" and the "intellectual passion" which in the preface is opposed to the prevalent "taken-for-granted religiosity" or the "more or less comfortable settling down with half-truths or even the organized delusions embodied in the various social institutions".

Dr. Berger is a sociologist, and he uses the tools of his profession in his analysis, as he not only points out but feels frequently constrained to justify. He makes generous use of the findings about church life in many published sociological surveys and so provides an admirable bibliography for those who would want to go more fully into his many points. For this is no long book, in many ways a summary of what many others have been becoming aware of, but

stamped with the conviction and urgency of the author's own faith which make it an admirable book for students.

After a brief chapter setting out the main elements of North American civilization, his indictment of the "religious phenomenon" is launched from five sides consecutively. In the first place, he analyses the paradox that, although the percentage of church members in the population has grown to over sixty per cent and is still rising rapidly, American life is increasingly "secularized" : "within the broad areas of political, economic and social life, religious motives appear to be of little relevance" ; despite its publicly acknowledged function of "symbolic integration", institutionalized religion is irrelevant to the major forces and developments in American society. He then shows how the churches unconsciously foster the ethical and cultural norms that are already accepted in society : this-worldliness, success competitively achieved, activism and social adjustment ; religion becomes ideology and finally illusion. The identification between religion and American political life, despite the "precarious myth" of the separation of church and state, can be seen from both sides : in the homage paid by politicians to religion (cf. Eisenhower's famous remark : "Our government makes no sense unless it is founded in a deeply felt religious faith — and I don't care what it is") and in the religious language and ceremonial in which their deliberations and utterances are inevitably couched ; on the other hand, in the huge tax and other concessions enjoyed by the churches, the legal disabilities imposed in some states on avowed unbelievers, and the mores of state institutions : "The same government that builds the walls of penitentiaries provides the salary of the prison chaplain." The chapter on social religion documents at some length "the somewhat strange fact that a person's religious affiliation immediately gives one an idea of that person's social status" ("we are all familiar with the young Baptist salesman who becomes an Episcopalian sales executive") and the built-in processes by which the churches officially hide this from themselves. The note is perhaps surprising from a society so commonly held to be egalitarian, but the investigation could be a model for most other areas. Finally, in perhaps the most savage section of the book, the psychological aspects of conventional religion are held up to the light. The result is best put in the words of Dr. Berger's own conclusions :

> The religious institution serves to 'socialize' the individual in such a way that he will conform to the norms of his social group, regardless of what these norms are. Insofar as the norms include prejudice or anti-democratic values, religion serves to accentuate these

> as well. In lucid form we are confronted here with the psychological dimension of our religious establishment. Religion provides the individual with the means by which he can hide from himself the true nature of his existence. Religion reassures and strengthens him in his social roles, however 'inauthentic' these may be. Religion thus tends to be an obstacle in the progress towards 'authenticity' as a person. In a word, religion prevents ecstasy. It prevents the individual from stepping outside the routines of his everyday life in society and looking at himself in freedom.

One turns to the second part of the book in high anticipation of seeing whether the remedies proposed match the radical, prophetic character of the analysis. Well, as many have felt about Amos, Isaiah, and the rest, they don't. The material is every bit as acute and perceptive, but remains largely analytic and negative : one is perhaps not too much helped along the road to faith by knowing that "the act of religious affiliation may thus be, in fact, the final ratification of a religious posture resolutely turned away from the possibility of conversion".

Nevertheless there are some fine things here — not least for the student, whose "task of theological construction... means a return to painstaking and passionate intellectual effort, the willingness to confront the Christian faith with all the critical faculties of the mind and to find the means to articulate this faith in our own historical moment". How many theological students have paid attention to the "subtle but far-reaching change of interest in the subject matter of the curriculum. One is no longer interested in the question, 'What is the truth ?' One asks instead, 'How can I preach this ?' "

He makes a most useful distinction and presentation of four types of social engagement — Christian diaconate, Christian action, Christian presence, and Christian dialogue — all subject to the overriding consideration, a word which we perhaps badly needed to hear at Strasbourg in the rash of enthusiasm for new forms of mission, that "What we must plan is our own response to our very own situations. In these situations we must do what we think we have to do. The final consequences of our actions cannot be foreseen. This is why the discussion of the relationship of old and new forms of the Church, as soon as one gets beyond immediate practical questions, often takes on a strange character of unreality." The book ends with a call to what has been earlier described as "a rather level-headed kind of enthusiasm" here put more vividly : "Our time has had its share of organization men. Now it needs insurrectionary spirits, adventurers, rebels. And it needs — very badly indeed — Christian rebels" — "loud-mouthed morality". In a brilliantly thought-provoking

formula he defines Christian rebellion in terms of its "lack of principles and its lack of mythology".

Despite the irony of a book which tirades against "program emphases" being commissioned as the study book for the National Student Christian Federation's 1961-62 theme within the Life and Mission of the Church program, one rejoices at the vigour and realism it brings to the whole project. It is exactly the type of regional study to which we have now set our hands, concrete, realistic, and detailed, yet informed by that same theological urgency which was so evident at Strasbourg and which must be the hallmark of all our efforts.

Even beyond the confines of its own fortunate constituency it deserves attention, both as a model to be imitated in every other region and for the pertinent insights it will itself convey. The picture of where the rest of us also are going is frightening indeed, but the picture includes in this case its painter, and if this is typical of North American student Christian thinking and commitment, then we can rejoice within the fellowship of the WSCF at the foretaste of our future on earth as well as in heaven.

D. Martin Conway.

The Industrial Struggle and Protestant Ethics in Canada, by Stewart Crysdale. The Ryerson Press, Toronto. 212 pp. $4.00.

In France, the churches face hostility ; in Britain, apathy ; in the United States, the dangers of opulence and respectability. It is all the more interesting to know about the churches and industrial situation in Canada, which has close links with all these three nations.

The larger part of this book consists of "observations", clearly the fruits of painstaking historical and sociological research. It would seem fully to merit its publisher's description as "the first serious attempt to trace the rise of industry in Canada as it affected the churches and as in turn the churches sought to interpret it and to relate the Christian gospel to it". The industrial and social scene in Canada is reviewed from about 1870 to the present day, and a large number of references and quotations illustrate the changing attitudes and activities of the various Christian denominations towards industry and society.

So comprehensive a survey in so small a space could not be without some defects. A number of statements about the changing cultural patterns and group structures of Canadian society are so terse and technical in phraseology as to be almost incomprehensible,

at least to me. I am also far from confident that the author always knows himself what he is saying. It is hard to believe that one who refers to "the astute observation of Karl Marx that dialectical materialism is characteristic of contemporary technological society", and asserts that the "abstract" laws of supply and demand "have operated rarely in Canada", has much understanding of either Marxism or economics.

Much useful material is gathered together describing the changing patterns of industrial organization and the evolution of outlook of the churches. We are shown in turn the 1870's, with the firm devotion to the Protestant ethic of individualism evidenced by many Christians ; the social idealism of the 1920's and 1930's, and the present-day preference for the "mixed economy". But I was a little dissatisfied with the tendency to go beyond historical objectivity and yet fall short of penetrating analysis. The reader is apparently expected to feel certain that the individualistic and socialist idealisms of the past were equally misguided ; but since we are not told exactly how the Christians of the day were led into error, we are hardly entitled to feel sure that the "mixed economy" is not simply a third transient form of idealism.

The last part of the book is devoted to "reflections". I did not turn to this part very hopefully, since it is notoriously difficult to generalize about social action without either making too many subjective political judgments or being content with mere platitudes.

To my surprise I found forty pages of the most penetrating and valuable treatment of Christian social ethics that it has ever been my lot to read. Thoroughly grounded in the central truths of the Christian faith, these chapters also emphasize the need to make full use of the techniques of sociology and economics. Such subjects as selfhood and society, property and profit, are briefly but convincingly dealt with.

An unswerving course is steered between the maelstroms of "Christian principles" and ethical relativism. The doctrine of the Trinity is lucidly expounded as the basis of Christian action. If only more Christian preachers could so proclaim their trinitarian faith, no longer as a device to confuse the faithful but as the root and ground of every Christian's working life, the Kingdom would be immeasurably nearer fulfilment.

The book concludes with a new look at our understanding of creation, salvation, sanctification, and Christian hope, and the laying down of five specific tasks for the churches. I cannot myself feel that these tasks, or indeed the whole of the section on "reflections", are

quite so certainly related deductively to the "observations" as the author seems to claim. But whatever their source, these last forty pages should be written into every Christian's mind and heart.

J. TENNANT SMITH.

CHRISTIANS IN AN INDUSTRIAL SOCIETY, by Richard Taylor. SCM Press, London. 128 pp. 8s. 6d.

In this brief book, the author gives a summary of a twelve-months' study of contemporary experiments by various churches in the industrial parts of Great Britain. Extensive travelling, more than three hundred interviews and conversations, the experience of three years as industrial secretary of the British SCM, one year as a labourer in a steel works, and a degree in chemical engineering form the background of this study by a young Congregational minister.

The author sketches briefly the impression which normal church-going Christians and traditional church activities make on the average person engaged in industrial work in Great Britain. He then tells the story of various "experiments in industrial Christian living". These projects range from fundamentalist approaches to the famous Sheffield Industrial Mission of "Ted" Wickham. Individual stories of twelve Christian laymen working in different positions in industry complete the picture of what it means to live as a Christian in this industrial society.

In drawing his conclusions, the author never leaves the ground of what his observations and experiences have shown him to be true. Frequently he illustrates his points with skilfully chosen quotations from people with whom he spoke. Portions of the book are as vivid and dramatic as a novel.

Even though this does not claim to be a study of the whole Church in *the* present-day industrial society, but of Christians in *an* industrial society, there is hardly a relevant question upon which the book does not touch. Especially important is the author's insistence that "it is not necessary for Christians to try to bring God into industry, for he is already there". He maintains that the Church needs rather to change and develop its thought, structures, and worship in order to train its members to live in an ever-changing industrial society, where the traditional differentiation between "the ministry" and "the laity" appears to be as equally out of date as the division of the Church into denominations.

HEINRICH C. ROHRBACH.

TECHNICAL EDUCATION, No. 3 in a Series of Publications of the International YMCA Centre, Castle Mainau, Germany. 100 pp.

This book was published in 1959 as a summary of a European consultation on technical education, held by the YMCA. Section I deals with the history of technological education in Europe, especially with the development from the empirical to the scientific stage, and with the struggle of technological education against the dominating role of the classical educational system which excluded the natural sciences and technology from university training.

Section II analyses the dilemma of technical education which gives no place to the goals and values for which people are trained in technology. It is maintained that the role of Christian education within technological education is precisely this: to bring into the teaching of technology the conception of the nature and destiny of man as revealed in Christ. It is also maintained that technology itself points to the necessity for the exercise of discipline and responsibility in the use of the power which technical knowledge gives to man.

Section III reports on different ventures by the YMCAs of Great Britain and Germany in the education of young people for technical vocations and professions.

The main value of the book is likely to be in the very practical description it gives of the present situation of technological education in Europe and its historic background. But it will also serve as a basis for discussion of the ways in which Christian theology can enlighten technical education and the implications of technical knowledge for the understanding of the Christian faith.

HEINRICH C. ROHRBACH.

THE UNIVERSITY TODAY: ITS ROLE AND PLACE IN SOCIETY, edited by Bernard Ducret and Rafe-uz-Zaman. World University Service, Geneva. 333 pp. Swiss francs 17.—.

This is an international study, as a further sub-title suggests, in which the Federation among a number of university organizations played a part. Recognizing the fundamental changes which higher education has been undergoing, as a result of far-reaching social and cultural transformations as well as the rapid growth in quantity and complexity of human knowledge, various organizations co-operated in drafting plans for a discussion of university problems. The steadily growing size of university communities, and other problems involved in adapting higher education to the needs and requirements of

societies so pressed by technological advances and the demand for economic growth and social change, were intended to be the focus of this study and discussion on an international scale. When the Federation, Pax Romana, World University Service, and other bodies brought their proposal for a round-table conference to UNESCO for sponsorship, they were encouraged by having the plans accepted in principle. Because of the lack of financial support, however, further steps towards holding the conference could not be taken immediately. This volume nevertheless sets forward the entire project, and is the beginning of the present phase of a continuing effort to realize the remaining hope of an international confrontation of thought and experience on major issues facing higher education in the world today.

There are many significant essays in this book, all of them focused upon the university as a social institution in the context of a major future direction. Critical reflections on the basic areas of university thought are set forth by some fifteen or twenty educators from as many different regions of the world. A wide variety of vital ideas and practical suggestions is offered, and these can assist all readers to gain further insight into their own situations, problems, and potentialities, as well as to understand those of others, and can contribute to the enterprise of critical reflection on the university, both as an ideal and in its practice. The orientation of the essays is practical ; the writers are, for the most part, critical analysts ; and the editors have presented the entire study in a most competent way, introducing it in an essay admirably clear in content, and outlining probing questions at the beginning of each major section. The book should, therefore, not only be read, but studied as well ; it can be an especially helpful and up-to-date resource for those who in the past found Moberly and Coleman so provocative and stimulating, but who now seek for help on a more recent range of issues.

There are seven major sections : 1) Professional Training and University Education ; 2) The University as a Centre of Research ; 3) The Cultural Function of the University ; 4) Autonomy of the University ; 5) Access to Higher Education ; 6) Quest for the Unity of Knowledge, and 7) The University Community — Partnership and Co-operation. Many of the specific ideas will not strike the reader as new and original contributions, for he will have read the same kind of generalized statements in documents and heard them in speeches. "As an ideal, the university in modern society should be both conservative and progressive" (p. 23). "A country with a great spiritual heritage undergoing rapid industrialization has to depend on its

universities for the conservation of the past and the naturalization of the new present" (p. 128). "Autonomy is a basic requirement of all university organizations" (p. 149). "The university and its role and place in society cannot be considered apart or isolated from the whole concept of education in society" (p. 211). These are several random examples of the broad or sweeping statements which reflect much of the current discussion. However, the strength of the volume does not depend on these generalized types of assertions.

The genuine strength of the essays lies in the diversity of the presentations. There is a kind of "encounter" in the book, though it must, for the most part, be implicit. Very seldom are the different presentations in sharp or sustained argument. Positions on questions are stated from a variety of viewpoints ; other comments are helpfully added at the conclusion of major presentations. Only a more personal engagement of the authors than a book permits would carry the discussion forward to encounter. Thus, the original plan for a round-table conference must still be realized ; the only approximation short of this is to have seminars and discussions in many university centres throughout the world, giving this book's contents sustained and serious attention.

There are too many specific essays to permit careful criticism of them. It appears to me that a review of a critical nature would need to be prepared by someone who has participated in a series of seminars for which this volume was the study document. It is a book to stimulate thought, reflection, and significant discussion. The subjects it has singled out are basic, though there may well be others which are equally so. The writers have achieved an amazing degree of disciplined concentration on the questions actually raised, though the perspectives from which they have written are so widely varied, and hence a kind of unity in diversity exists. The bibliography itself, as well as the references in footnotes to additional writings, cover an impressive literature. And, like the subject about which the book revolves — *The University Today* — it is a strange and unique meeting place of ideas and persons, concerned to find a way towards the solution of technical issues in a manner which preserves and advances both wisdom and humanity. Certainly these are the terms which give meaning to the search for knowledge. Their exploration is the end also for the general task of the Christian in the academic community. Whether the Christian student or university teacher can determine precisely how his specific calling may be understood and followed in this context, is a question which is not taken up in the book. But apart from considering it as a question which needs this context — the range of issues common to the human

community in higher education — it is a question hardly worthy of being asked, and quite unlikely to be answered in a realistic way. The truth here, as in every area, is not the end of a search, but a path in which one is called to walk.

J. Edward Dirks.

The Church and the Arts, edited by Frank Glendenning. SCM Press, London. 128 pp. 6s.

Frank Glendenning, who made his Anglican church in Hull, England, a centre for artists, has edited a paperback by some of them and introduced it himself. The chapters are on "The Incarnation and Art", visual arts, architecture, theatre, music, and poetry. The book ends with a description of the Hull experiment.

For the most part these writers seem to think the artist is guardian of a mystery that dull suburbia rejects. They want to bring their vision into the Church. They do not speak much of the natural bridge that exists between the artist as artisan and the dirty work of factory and building lot. They are well in touch with material cultures of the past, but a bit out of sorts with the scientific culture and technology of the present. They identify themselves with the old visionary *élites*, but they seem to be rather out of touch with the new engineers and industrial designers.

There lies the cause for concern. We need artists whose centre of reference is out in the world. Instead they come staggering into the churches for consolation and employment. They feel the world has rejected them. Our artists, as good laymen, must find their vocations in the astonishing new possibilities of prefabrication, electronic diffusion of images, photographic experiment, new scales and rhythms.

It is not likely to be true again for many generations that the churches will be the best patrons of artists. Those of them who go to church will normally do their best work on "outside" commissions like designing textiles and plastics, town-planning, graphics for printers, or original models for mass production. The relative anonymity of these secular jobs is good for artists ; they become more humble and more co-operative and lose the romantic longing to be treated like tribal magicians. Some of the best of them are getting used to the feeling and enjoying the company of scientists and managers without losing their creativity.

Against such a background the book seems slightly off-centre. The theological essay, good as far as it goes, needs to say more about the presence in the world of the artist as manufacturer, less about the technical niceties of "communication" and "contemplation".

Theologies of art need to smell more of the painter's oils ; they need to sound like instruments tuning up or concrete being poured. The theology, in other words, has to be more in the artist's workshop where things are being made, less in the scholar's study where notions are being considered.

The same general criticism applies to the other chapters.

It is certainly pleasant enough to have Christian artists putting glass and sculpture into our church buildings. But the best of them have problems when they come out of the everyday back into our nineteenth century preserves. Henry Moore's pagan graces in parks look more at home than his madonnas next to chancels. The section on church architecture misses the point of the finest contemporary churches on the continent and in America. These buildings are made by laymen, men who can turn their hand to anything, and are more interested in their secular vocation as architects than in occasional commissions to do churches. There are many fine new churches in and around Basel, but the achievement that puts them all in the shade is a power-house spanning the Rhine. If we had churches with laymen who could make more power-houses to the glory of God, we could afford to defer some of the stained glass and tapestry, the "liturgically appropriate ground plans", till later.

In the theatre Frank Glendenning (and his wife Frances, who writes the chapter) would be the first to admit that the situation is the same. Good "Christian theatre groups" know the theological awe that settles over them when they see Beckett's *Waiting for Godot* or some piece of Brecht performed with searing force by players who never go to church.

The essay on music is the best in the book. It exposes the pastiche and sham, the self-conscious revivalism, of what is often considered to be the "good church music of our time". We browse about in the seventeenth century, but we have closed our doors against the religious impulse in jazz and the Christian masterpieces of Stravinsky.

"It is a Christian task to encourage the love of poetry, and to make our poets feel that the Church is once more a patron and a refuge in the 'wasteland' ", says the chapter on the poets. But the main isolation of the poet is not from "mother church" (at least not from the poet's point of view). He is a stranger to "father society". For the authentic artist, that is more serious. He does not want a "patron" or a "refuge". Patronage means someone is patronizing him. His basic humanity resents it. That is why many good poets say (in effect) to the Church : "I'm a professional word-user. I don't want to be domesticated or take a quick nap under medieval opiates." We must listen to this secular voice and try to send out some Christian

poets into advertising and journalism, where they can get their hands dirty without losing their souls. It is worth the risk. "Patronage" and "refuge" would then be replaced by recognizing that the artist is an artisan, the Church is the mission, and technological culture has come to stay.

JOHN GARRETT.

BOOKS RECEIVED

Mention here neither implies nor precludes review. Books for review should be sent to the World Student Christian Federation, 13 rue Calvin, Geneva, Swizerland.

LA PRIÈRE POUR L'UNITÉ, by Dom Olivier Rousseau, Paul Evdokimov, and Max Thurian. Les Presses de Taizé, France. 47 pp., paper cover.

TO ALL NATIONS. CHRISTIAN EXPANSION FROM 1700 TO TODAY, by John Foster. World Christian Books No. 35, Second Series. Lutterworth Press, London. 87 pp., paper cover. 2s. 6d.

WHAT IS MAN ?, by Stephen Neill. World Christian Books No. 36, Second Series. Lutterworth Press, London. 79 pp., paper cover. 2s. 6d.

THE CHRISTIAN NURSE, by Michael Wilson. Edinburgh House Press, London. 32 pp., paper cover. 2s.

COLOUR PREJUDICE, by Jean M. Fraser. Edinburgh House Press, London. Christian Focus Series No. 12. 36 pp., paper cover. 2s.

HEALTH, by Dr. Tony Chase. Edinburgh House Press, London. Christian Focus Series No. 13. 36 pp., paper cover. 2s.

UNIVERSITY REFORM IN LATIN AMERICA: ANALYSES AND DOCUMENTS. Published on behalf of the International Student Conference by the Coordinating Secretariat of National Unions of Students, Leiden, Netherlands. 144 pp., paper cover.

L'ECCLÉSIASTE A VÉCU LA VIE, by Walter Lüthi. Translated by Daniel Hatt. Editions Labor et Fides, Geneva. 130 pp. Paper cover Sw. Frs. 8.70; hard cover Sw. Frs. 12.70.

Publications of the Institute of Higher Education, Teacher's College, Columbia University, New York, USA :

LIBERAL EDUCATION IN THE PROFESSIONS, by Earl J. McGrath. 63 pp., paper cover.

ARE LIBERAL ARTS COLLEGES BECOMING PROFESSIONAL SCHOOLS ? by Earl J. McGrath and Charles H. Russell. 26 pp., paper cover.

THE LIBERAL ARTS AS VIEWED BY FACULTY MEMBERS IN PROFESSIONAL SCHOOLS, by Paul L. Dressel, Lewis B. Mayhew, and Earl J. McGrath. 68 pp., paper cover.

THE GRADUATE SCHOOL AND THE DECLINE OF LIBERAL EDUCATION, by Earl J. McGrath. 65 pp., paper cover.

WORLD CULTURES AND WORLD RELIGIONS, by Hendrik Kraemer. Lutterworth Press, London. 386 pp. 35s.

IMAGES OF THE CHURCH IN THE NEW TESTAMENT, by Paul S. Minear. The Westminster Press, Philadelphia. 294 pp. $6.00.

PAKISTAN AND THE MODERN WEST, by Sheila McDonough. Sh. Ghulam Ali & Sons, Lahore. 185 pp. Rs. 12.

CHRIST ET ADAM D'APRÈS ROMAINS 5, by Karl Barth. Labor et Fides, Geneva. 80 pp. Swiss francs 4.80.

LETTRE A UN PASTEUR DE LA RÉPUBLIQUE DÉMOCRATIQUE ALLEMANDE ET LA RÉPONSE, by Karl Barth. Labor et Fides, Geneva. 65 pp. Swiss francs 3.45.

ACADEMIC ILLUSION, by Denis Baly. The Seabury Press, Greenwich, Conn. 179 pp. $2.25.

WORSHIP IN THE WORLD'S RELIGIONS, by Geoffrey Parrinder. Faber & Faber, London. 239 pp. 21s.

THE SUBURBAN CAPTIVITY OF THE CHURCH, by Gibson Winter. Doubleday & Co., New York. 216 pp. $3.50.

TENTATION, by Dietrich Bonhoeffer. Labor et Fides, Geneva, Switzerland. Paper cover, 58 pp. Sw. Frs. 3.60.

L'HUMANISME SOCIAL DE CALVIN, by André Bieler. Labor et Fides, Geneva, Switzerland. Paper cover, 110 pp. Sw. Frs. 4.00.

CHEMINS D'EST ET D'OUEST, by Hans A. de Boer. Labor et Fides, Geneva, Switzerland. Paper cover, 285 pp. Sw. Frs. 13.50.

LIGHT IN DARKNESS, by E. H. Robertson. Edinburgh House Press, London. Paper cover, 109 pp. 6s. 6d.

THE CHRISTIAN PHILOSOPHY OF SAINT AUGUSTINE, by Etienne Gilson. Victor Gollancz Ltd., London. 398 pp. 42 s.

ISRAEL UND DIE KIRCHE, Eine Studie, im Auftrag der Generalsynode der Niederländischen Reformierten Kirche zusammengestellt von dem Rat für das Verhältnis zwischen Kirche und Israel. EVZ-Verlag, Zurich. Paper cover, 93 pp. Sw. frs. 5.60.

THE PRIVATE DEVOTIONS OF LANCELOT ANDREWES, translated and with an introduction and notes by F. E. Brightman and including "Lancelot Andrewes" by T. S. Eliot. Living Age Books published by Meridian Books, The World Publishing Co., New York. Paper cover, 392 pp. $1.65.

COMMON SENSE ABOUT CHRISTIAN ETHICS, by Edward Carpenter. Victor Gollancz Ltd., London. 174 pp. Cloth cover 12s. 6d.; paper cover 6s.

COMMON SENSE ABOUT RELIGION, by John Hadham. Victor Gollancz Ltd., London. 176 pp. Cloth cover 12s. 6d. ; paper cover 6s.

THE NEW ARCHITECTURE OF EUROPE. An illustrated guidebook and appraisal, with 200 photographs, by G. E. Kidder Smith. Meridian Books, The World Publishing Co., New York. Paper cover, 358 pp. $1.95.

REDEN UND AUFSÄTZE, by Walter Freytag. Chr. Kaiser Verlag, Munich. Paper cover, 293 pp.

GOD'S PEOPLE IN INDIA, by John W. Grant. Church Missionary Society, London. Paper cover, 112 pp. 6s.

THE QUIET CRUSADERS, by Henry L. McCorkle. Friendship Press, New York. 175 pp. Cloth cover $2.95 ; paper cover $1.95.

GOD'S KNOTTY LOG : SELECTED WRITINGS OF JOHN BUNYAN, edited and introduced by Henri A. Talon. Living Age Books published by Meridian Books, The World Publishing Company, New York. 313 pp. Paper cover $1.65.

UNE ETHIQUE DE LA SAGESSE, Commentaire de l'Epître de Jacques, by Louis Simon. Labor et Fides, Geneva. 192 pp. Paper cover, Sw. Frs. 12.60; hard cover, Sw. Frs. 16.50.

THE CONTEXT OF DECISION, by Gordon D. Kaufman. Abingdon Press, New York. 126 pp. $2.50.

LES SAISONS DE LA VIE, by Paul Tournier. Labor et Fides, Geneva. Paper cover, 56 pp. Sw. Frs. 3.30.

ŒUVRES de Martin Luther. Volume IX. Labor et Fides, Geneva. 363 pp. Paper cover Sw. Frs. 22.50 ; hard cover Sw. Frs. 26.50.

THE CHURCH OF ENGLAND, by E. W. Watson. Oxford University Press, London. 192 pp. 8s. 6d.

The following books have been received from the SCM Press, London, in addition to those reviewed in this issue of The Student World :

THE MIND OF JESUS, by William Barclay. SCM Paperback, 192 pp. 5s.

CHRISTIANITY AND COMMUNISM TODAY, by John C. Bennett. The Living Church Books. 128 pp., paper cover. 6s.

CAPTAIN'S ORDERS, by Geoffrey Heyland. 160 pp. 10s. 6d.

MY OWN BIBLE STORIES, one book each for the Old and New Testaments, text by Kathleen Downham and illustrations by Willi Trapp. Paper cover, 48 pp. 4s. each.

A CHRISTIAN IN EAST GERMANY, by Johannes Hamel. 128 pp. 8s. 6d.

INFANT BAPTISM IN THE FIRST FOUR CENTURIES, by Joachim Jeremias. Library of History and Doctrine. 104 pp. 12s. 6d.

THE WESTMINSTER CONFESSION FOR TODAY, by George S. Hendry. Library of History and Doctrine. 253 pp. 21s.

ANSELM : FIDES QUAERENS INTELLECTUM, by Karl Barth. Library of Philisophy and Theology. 176 pp. 21s.

A DIALOGUE OF RELIGIONS, by Ninian Smart. Library of Philosophy and Theology. 144 pp. 18s.

ONE LORD ONE BAPTISM : Reports of the Commission on Faith and Order of the World Council of Churches. Studies in Ministry and Worship. Paper cover. 6s.

THE ETERNAL IN MAN, by Max Scheler. Library of Philosophy and Theology. 380 pp. 63s.

THE BOOK OF JEREMIAH, by H. Cunliffe-Jones. Torch Bible Commentary. 228 pp. 15s.

I & II PETER AND JUDE, by C. E. B. Cranfield. Torch Bible Commentary. 208 pp. 12s.

ETHICS AND THE GOSPEL, by T. W. Manson. 112 pp. 12s. 6d.

THE RECOVERY OF CONFIDENCE, by E. H. Robertson. The Bible in Our Time Series. 64 pp. 4s.

TAKE AND READ : A GUIDE TO GROUP BIBLE STUDY, by E. H. Robertson. 128 pp. 8s. 6d.

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